Ex libris Johannis Briſcoe
1808

John Crawford.
M. D.

Works of

Dr Richard Mead

died London

1754 in 81 age

Crawford

upon this abſtruſe ſubject are grounded upon the principles of planetary attraction, lately diſcovered by Sir Iſaac Newton; and, as the ſyſtem of that illuſtrious philoſopher was then but little known, ſo it is eaſy to conceive, that our author's performance would be rather admired, than underſtood, by the generality of readers. He republiſhed it in 1748, with alterations and additions.

Dr. Mead, in his travels through Italy, met with Bonomo's letter to Redi, ſetting forth his diſcoveries with relation to the cutaneous worms, that generate the itch. He preſented an analyſis of it to the Royal Society; which, together with his Account of Poiſons, deſervedly procured him a place in that very uſeful body. This analyſis was inſerted in the Philoſophical Tranſactions [d] of the firſt months of the year 1703. This ſame year he was choſen phyſician to St. Thomas's hoſpital; and about the ſame time was appointed, by the Surgeons company, to read the anatomical lectures in their hall.

In 1707, his Paduan diploma for doctor of phyſick was confirmed by the univerſity of Oxford. In 1716, he was admitted fellow of the College of Phyſicians; and went through all the offices of that learned body, except the preſidentſhip, which he declined in the year 1744. Though nothing could be greater than our phyſician's merit, yet it might not have been thus univerſally known ſo ſoon, if it had not been for the famous Dr. Ratcliffe. Ratcliffe took a particular pleaſure in patronizing a young man of Mead's excellent and amiable endowments: and in 1714, when the former died, the latter ſucceeded him in his houſe, and in the greater part of his buſineſs. He had quitted Stepney ſome years before this, and had reſided in Crutched and then in Auſtin-fryars, for the ſake of being near St. Thomas's hoſpital. The diſtance of his new habitation from thence, for Ratcliffe lived in Bloomſbury-ſquare, induced him to reſign his place of phyſician; upon which occaſion he received the unanimous thanks of the grand committee for his ſervices, and was preſented with a governor's ſtaff.

Dr. Mead was now at the head of his order, ws we learn from the teſtimony of writers, who cannot be ſuppoſed to have flattered. The celebrated Dr. Jurin addreſſed to him A Diſſertation concerning the Force of the Heart, written againſt what the no leſs celerated Dr. James Keill had advanced upon that ſubject: and he begins it in the following remarkable manner. "Sir: Though I am not ignorant how rude and im-

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[d] Artic. II.

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"perfect this diſſertation is, yet I readily venture to ſubmit to "your penetrating judgment. For how could I wiſh for a "more impartial judge, or how could I chooſe a more pro-"per umpire, than him, whoſe remarkable candour and hu-"manity are as well known to us all, as thoſe excellent ta-"lents which he enjoys, adorned with every kind of learn-"ing; and by whoſe bright genius and fine judgment we ſee "the theory of medicine enlightened and illuſtrated, and the "practice of it ſtrengthened and made eaſy? Nor is there any "one living, of whoſe approbation I ſhould be more deſir-"ous, or under whoſe authority this diſcourſe, if it has the "good fortune not to diſpleaſe you, will be more ſafe from "the cavils of ſome perverſe people [e]." Dr. Keill alſo addreſſed his Anſwer to the foregoing Diſſertation to Dr. Mead: "For, ſays he to him, as my adverſary has beſought you to "be his patron, ſo I deſire to leave this controverſy to your "determination, who are a fit and learned judge of it. And "for your part, great Sir, who hold the firſt rank in phyſick, "be pleaſed ſo to moderate by your prudence the diſputations "of thoſe who differ in opinion, that they may not be con-"temptible to the unlearned, but profitable to the learn-"ed [f]." Theſe papers were written at firſt in Latin, printed in the Philoſophical Tranſactions, and dated, the former January, the latter June, 1719: from which it appears, that Dr. Mead was applied to by the ableſt men, as a fit moderator and judge in the moſt difficult queſtions, although he was not much beyond that period of life, when the generality of his profeſſion begin to emerge.

It is remarkable, that party-principles never influenced this great man's attachments: and tho' he was himſelf a very hearty whig, yet he was upon terms of the ſtricteſt intimacy with Garth, Arbuthnot, and Freind. And when the laſt, upon a ſuſpicion of being concerned againſt the government with biſhop Atterbury, was committed a priſoner to the Tower in 1723, Dr. Mead conſtantly viſited him, and became one of his ſureties to procure his enlargement. But what contributed to cement the friendſhip between Freind and Mead, was a common quarrel they had been engaged in ſome years before. Dr. Mead having had frequent opportunities of experiencing the efficacy of purgatives to prevent, or at leaſt to leſſen, the ſecondary fever, which ſo often proves fatal in the confluent ſmall-pox, communicated this method of practice to ſeveral of his brethren, particularly to Ratcliffe and Freind. Freind adopted it; and, in his Commentary on the firſt and third books of Hippocrates's Epidemicks, publiſhed in 1717, inſerted the letter which Mead had written to him upon that ſubject ſome years before. Theſe two gentlemen being now conſidered as aſſociates in the ſame cauſe, a party was immediately formed againſt the new practice and its favourers; at the head of which was Dr. John Woodward, phyſick profeſſor at Greſham College, who publiſhed upon this occaſion, The State of Phyſick and Diſeaſes, with an Enquiry into the Cauſes of the late Increaſe of them, but more particularly of the Small-pox. In this performance Dr. Woodward was not content with condemning the practice, but treated its favourers with contempt and ill manners, and more particularly our author; whoſe reſentment, though juſt and well grounded, appears nevertheleſs to have been carried to a very exceptionable length, ſeeing it had not ſubſided twenty years after the death of his antagoniſt [g].

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[e] Keill's Eſſays on ſeveral Parts of the Animal Oeconomy, p. 54. Lond. 1738. [f] Ibid. p. 79, 84.

In 1719, when the plague was ſo fatal at Marſeilles, the lords of the regency directed Mr. ſecretary Craggs to apply to Dr. Mead, as a man the beſt qualified to find out the moſt effectual methods to prevent its ſpreading. This occaſioned the publication of his Short Diſcourſe concerning Peſtilential Contagion, and the Methods to be uſed to prevent it, in 1720; which was ſo greedily received, that no leſs than ſeven editions were printed in one year. The eighth, which appeared in 1723, was enlarged with many new obſervations, and a whole chapter on the method of cure; and the laſt, in 1744, was not without improvements.

In 1723, Dr. Mead pronounced the Oratio Harveiana before the College of Phyſicians, which was publiſhed in 1724; and to it was annexed, Diſſertatio de nummis quibuſdam a Smyrnæis in medicorum honorem percuſſis. This oration was attacked with ſome ſmartneſs, by the moſt ingenious and learned Dr. Conyers Middleton, in a piece intitled, De medicorum apud veteres Romanos degentium conditione diſſertatio, in qua contra viros celeberrimos Jacobum Sponium & Richardum Meadium ſervilem atque ignobilem eam fuiſſe oſtenditur [h]. Mead's ſide of the queſtion was defended by Dr. John Ward, late profeſſor of rhetorick in Greſham College; whom Dr. Middleton, in a reply, treated with much contempt. Neverthelefs, he every where expreſſes the greateſt regard for Dr. Mead; and, in a work publiſhed ſeveral years after, mentions him in the moſt honourable manner. He is ſpeaking of an antique picture, which he ſuppoſes to be the firſt, and the only one of the ſort ever brought to England; "Donec Meadius noſter, ſays he, artis medicæ decus, qui "vitæ revera nobilis, vel principibus in republica viris, ex- "emplum præbet, pro eo, quo omnibus fere præſtat, artium "veterum amore, alias poſtea quaſdam & ſplendidiores, opi- "nor, Roma quoque deportandas curavit [i]."

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[g] Preface to his Treatiſe on the Small-pox and Meaſles.

[h] Middleton's Works, vol. iv.

In 1727, ſoon after his late Majeſty's acceſſion to the throne, he was appointed one of the royal phyſicians; and for many years was engaged in the conſtant hurry of an extenſive and ſucceſsful practice. When, through age, he was grown unequal to the diſcharge of more active functions, and retirement was become abſolutely neceſſary, he took the opportunity to reviſe his former writings. Some have already been mentioned, which were republiſhed in this ſeaſon of his life; and in 1747, came out his diſcourſe, De Variolis & Morbillis, to which was annexed a treatiſe on the ſame diſeaſes, by the celebrated Arabian phyſician Abubeker Rhazes, faithfully tranſlated from the original Arabick into Latin. A copy of the only remaining Arabick manuſcript of Rhazes's treatiſe was communicated from Leyden by the celebrated Boerhaave; between whom and our author there always ſubſiſted a very friendly correſpondence. In his diſcourſe upon the Small-pox, there is a chapter upon Inoculation; from which it appears, that he was greatly concerned in introducing and eſtabliſhing this laudable practice among us.

The year 1749 furniſhed out two new productions from our author; namely, Medica ſacra, ſive de morbis inſignioribus qui in Bibliis memorantur commentarius; and A diſcourſe on the Scurvy, annexed to Mr. Sutton's ſecond edition of his Method for extracting the Foul Air out of Ships. The laſt, and, as ſome think, the moſt uſeful of all his works, is his Monita & Præcepta medica, publiſhed in 1751. Here, with great candour and ſimplicity, he communicates all the diſcoveries that long practice and experience had opened to him, concerning diſeaſes and their cures; and concludes with many ſalutary directions for preſerving the body and mind, perfect and entire, to a good old age. Though his faculties do not ſeem to have been at all impaired in this laſt work, yet he did not find himſelf in a condition to finiſh any thing further;

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[i] Germana quædam antiquitatis eruditæ monumenta, p. 2. Works, vol. iv.

but gently decaying, and growing weaker every day, he expired upon the 16th of February 1754, without viſible ſigns of pain, and was buried on the 23d in the Temple church, near his brother Samuel Mead, an eminent counſellor at law, who died twenty years before.

Dr. Mead was twice married By his firſt wife, Ruth, the daughter of Mr. John Marſh, merchant of London, whom he married in 1699, and who died in 1719, he had eight children; four of whom died in their infancy. Of the reſt, the ſecond daughter, now deceaſed, was married to the late Charles Bertie, of Uffington in Lincolnſhire, Eſq; the eldeſt to Dr. (now Sir) Edward Wilmot, and the youngeſt to Dr. Francis Nichols, both phyſicians in ordinary to his Majeſty. His only ſon, Richard Mead, is married to Anne, the daughter of William Gore, Eſq; of Tring, in Hertfordſhire. The doctor's ſecond wife, who is ſtill living, was Anne, daughter of Sir Rowland Alſton, Bart. of Odell in Bedfordſhire, whom he married in Auguſt 1724, but had no iſſue by her.

To attempt a formal eloge of this man, would be impertinent in a preface to his works; and eſpecially after what has been occaſionally dropped in the courſe of theſe Memoirs. There is however one circumſtance relating to him which deſerves to be mentioned, becauſe it is uncommon; which is, that by his ſingular humanity and goodneſs, he conquered even envy itſelf: and accordingly this compliment was juſtly paid him in a dedication, by the editor of Lord Bacon's Work's, in the year 1730.

It would be impertinent, in like manner, becauſe it would be tedious, to enumerate the great and various ſervices he did to the republick of letters: let it ſuffice to obſerve, what indeed every body knows, that few princes have ſhewn themſelves equally generous and liberal, in promoting ſcience, and encouraging learned men: and this is the true reaſon why Dr. Mead, notwithſtanding the immenſe gains ariſing from his profeſſion, did not die ſo rich, as might have been expected.

As to his literary collections and other curioſities, the world has already been acquainted with their value and contents by printed catalogues; and it may perhaps be ſaid, not unjuſtly, that no ſubject in Europe had a library and a cabinet ſo richly and ſo judiciouſly furniſhed. Nor did he make this great collection merely for his own uſe, but freely opened it to others; ſo that ingenious men were ſure of finding at Dr. Mead's the very beſt helps in all their undertakings.

He maintained a conſtant correſpondence with all the literati in Europe; and his reputation as a ſcholar, as well as a phyſician, was univerſally eſtabliſhed. There cannot be a better proof of this, than the king of Naples ſending him the two firſt volumes of Signior Bajardi's of the Antiquities found in Herculaneum; with the additional compliment of aſking in return, only, a complete collection of his own works. This prince at the ſame time invited him to his palace, that he might have an opportunity of ſhewing him all thoſe valuable monuments of antiquity; and Dr. Mead uſed to declare to his friends, that his years alone reſtrained him from undertaking a journey ſo ſuited to his taſte and inclination.

Upon the whole, no foreigner of any learning, taſte, or even curioſity, ever came to England, without being introduced to Dr. Mead, as it would have been a matter of reproach to have returned without ſeeing him. On theſe occaſions, his table was always open; where, what ſeldom happens, was united the magnificence of princes with the pleaſures of philoſophers.

To conclude: He was ſincerely the friend of all ingenious and learned men, at home and abroad: of Pope, of Halley, of Newton, with whoſe portraits his houſe was furniſhed. He preſented to the college of Phyſicians a marble buſto of Harvey, done by an excellent hand, from an original picture in his poſſeſſion; to which his own has been added by Dr. Aſkew, done by Roubilliac, and placed near Dr. Harvey.

His ſon has likewiſe cauſed a handſome monument to be erected to his memory in Weſtminſter-abbey, with the following inſcription by Dr. Ward, of Greſham-College :

M. S.

V. A. RICHARDI MEAD ARCHIATRI
ANTIQVA APVD BVCKINGENSES FAMILIA NATI
QVI FAMAM HAVD VVLGAREM MEDICINAM FACIENDO
IN PRIMA IVVENTVTE ADEPTVS
TANTA NOMINIS CELEBRITATE POSTEA INCLARVIT
VT MEDICORVM HVIVS SAECVLI PRINCEPS HABERETVR
IN AEGRIS CVRANDIS LENIS ERAT AC MISERICORS
ET AD PAVPERES GRATVITO IVVANDOS SEMPER PARATVS
INTER ASSIDVAS AVTEM ARTIS SALVTARIS OCCVPATIONES
OPERIBVS NON PAVCIS DOCTE ET ELEGANTER CONSCRIPTIS
QVAE INGENIO PERSPICACI ET VSV DIVTVRNO NOTAVERAT
IN GENERIS HVMANI COMMODVM VVLGAVIT
LITERARVM QVOQVE ET LITERATORVM PATRONVS
SINGVLARIS
BIBLIOTHECAM LECTISSIMAM OPTIMIS ET RARISSIMIS LIBRIS
VETERVMQVE ARTIVM MONVMENTIS REFERTAM COMPARAVIT
VBI ERVDITORVM COLLOQVIIS LABORES LEVABAT DIVRNOS
ANIMO ITAQVE EXCELSO PRAEDITVS ET MORIBVS HVMANIS
ORBISQVE LITERATI LAVDIBVS VNDIQVE CVMVLATVS
MAGNO SPLENDORE ET DIGNITATE VITA PERACTA
ANNORVM TANDEM AC FAMAE SATVR PLACIDE OBIIT.
XIIII KALENDAS MARTIAS A.D. MDCCLIV AETATIS SVAE LXXXI
ARTIVM HVMANIORVM DAMNO HAVD FACILE REPARABILI
QVIBVS IPSE TANTVM FVERAT DECVS ET PRAESIDIVM
BIS MATRIMONIO IVNCTVS
EX PRIORI DECEM SVSCEPIT LIBEROS
QVORVM TRES TANTVM SVPERSTITES SIBI RELIQVIT
DVAS FILIAS VIRIS ARCHIATRORVM HONORE ORNATIS
NVPTAS
ET VNVM SVI IPSIVS NOMINIS FILIVM
QVI PIETATIS CAVSA PATRI OPTIME DE SE MERITO
MONVMENTVM HOC PONI CVRAVIT

John H. Briscoe
1808.

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A MECHANICAL
ACCOUNT
OF
POISONS,
IN SEVERAL
ESSAYS.

ADVERTISEMENT.

THIS Book was firſt publiſhed in the year 1702, and reprinted with very few additions, in 1708. I then really intended never more to trouble myſelf about it : but the demand for it having for many years been ſo great, as to tempt ſome bookſellers to print it twice or thrice, very incorrectly, in a piratical way (as they call it) without my knowledge ; I have thought it right, both in juſtice to the public and myſelf, to give a new edition of it.

It will eaſily be believed, that after more than forty years (ſpent neither without ſtudy nor experience) I cannot be fond of a little performance in phyſic, written at a time of life, in which the facts muſt, for the moſt part, be taken from other authors, and the reaſonings upon them would often require more patient thinking, and a riper judgment. And therefore I make no doubt but the public always made great allowances upon this account, when they gave the book ſo favourable a reception.

In return to this kind uſage, I have now taken ſome pains to re-conſider my ſubject. Beſides many other improvements, I have often from my theory drawn obſervations, uſeful, as I imagine, in practice. Neither have I been aſhamed, on ſome occaſions, (as the Latins ſaid) *cædere vineta mea*, to retrench or alter whatever I have judged to be wrong. *Dies diem docet.* I think truth never comes ſo well recommended, as from one who owns his error : and it is allowed that our firſt maſter Hippocrates, never ſhewed more wiſdom and greatneſs of mind, than in confeſſing his miſtake, in taking a fracture of the ſkull for the natural ſuture [a] ; and the compliment, which Celſus [b] makes to him on this occaſion, is very remarkable and juſt : *More ſcilicet*, inquit, *magnorum virorum, et fiduciam magnarum rerum habentium. Nam levia ingenia, quia nihil habent, nihil ſibi detrahunt: magno ingenio, multaque nihilominus habituro, convenit etiam ſimplex veri erroris confeſſio ; præcipueque in eo miniſterio, quod utilitatis cauſa poſteris traditur.*

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[a] Epidem. lib. v. §. 14.

[b] Medicin. lib. viii. c. 4.

I might however urge in my excuſe, that as the notions I have retracted, regard chiefly the nervous fluid, and its properties; ſo my new reaſonings are founded upon experiments of electricity and attraction, applied to this fluid, which at the time of my writing were not known. The inſtructive Queries and Suppoſitions of Sir Iſaac Newton, and the ſurpriſing electrical operations of Mr. Stephen Gray [c], improved by monſieur Du Fay, at Paris [d], had not then enlightened the learned world.

But there are here two additions, which I ought particularly to mention: the firſt is the Introduction. Having obſerved, that the actions of poiſons, though they are of very different kinds, is generally uniform; and alſo, that the animal ſpirits are firſt affected by it; I have thought it proper, as this opinion may ſeem ſomewhat ſtrange and ſingular, to premiſe an inquiry into the nature of the nervous fluid, of which it muſt be owned that we know too little. And if, in a matter ſo abſtruſe and difficult, what I have advanced has more in it of conjecture than of demonſtration, it may be allowed to be be ſomething.

Quadam prodire tenus, ſi non datur ultra [e].

Whoever will paſs a judgment upon ſuch nice ſpeculations, muſt take the whole ſcheme together. Truth is always a connected ſcheme; and inferences juſtly drawn not only illuſtrate, but confirm one another.

The other addition is, "An anatomical deſcription of thoſe "parts in a Viper, and in a Rattle-Snake, which are con-"cerned in their poiſon," by our great anatomiſt the learned and ingenious Dr. Nicholls. He having taken notice, that the Anatomical Obſervations on the Viper, by Dr. Areſkine, in the firſt edition, were neither complete, nor in every point true, has been pleaſed to give a new anatomy of the whole head, not only of the common Viper, but alſo of that larger kind of it, the Rattle-Snake: that ſo thoſe parts, which cannot ſo eaſily be ſeen in the ſmaller, may more diſtinctly appear in the bigger animal. How accurately he has performed this taſk, and how thoroughly he has explained the mechaniſm and offices of the ſeveral organs, any one may judge, who will compare his deſcriptions with the beſt of thoſe, which have been hitherto made by other anatomiſts.

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[c] Vid. Phil. Tranſ. [d] Vid. Memoires de l'Academie, 1733, 1734, 1737. [e] Horat. Epiſt. i. v. 32.

THE PREFACE TO THE FIRST EDITION.

TO give an exact and particular account of the nature and manner of the action of Poiſon, is no eaſy matter; but to diſcourſe more intelligibly of them, than authors have hitherto done, not very difficult. One may without much pains ſhew their effects to be owing to ſomething more than the bare qualities of heat and cold; and diſcover the footſteps of mechaniſm in thoſe ſurpriſing phænomena, which are commonly aſcribed to ſome occult or unknown principle. But to unravel the ſprings of the ſeveral motions, upon which ſuch appearances depend, and trace up all the ſymptoms to their firſt cauſes, requires ſome art as well as labour: and that both upon the account of the exquiſite fineneſs, and marvellous compoſition, of the animal machine in which they are tranſacted, and of the minuteneſs of thoſe bodies, which have the force to induce in it ſuch ſudden and violent alterations.

I have attempted ſomewhat this way in the following Eſſays; in which I do not promiſe methodical and finiſhed treatiſes, but only ſome ſhort hints of natural hiſtory, and rude ſtrokes of reaſoning; which, if put together and rightly improved, may perhaps ſerve to furniſh out a more tolerable Specimen of the Doctrine of Poiſons, than has yet been publiſhed.

The firſt draught of this ſmall piece I made ſome years ſince, entertaining myſelf at leiſure hours with experiments on Vipers, and other venomous creatures; examining now and then the texture of Arſenic, Mercury Sublimate, and the like malignant ſubſtances; turning over what authors had ſaid on the ſeveral ſubjects, and making ſuch remarks as from time to time occurred.

Theſe continued inquiries made up at laſt three or four ſhort diſcourſes; which when I began to digeſt into order, the increaſe of buſineſs contracted the intervals of my ſpare time: and the diverſion of ſuch ſtudies quickly giving way to the ſeverity of more neceſſary labours, they were quite thrown by. Till talking long ſince with Dr. Areſkine, concerning the Viper, I took occaſion to review my ſcattered papers, and confirm my reaſonings by new experiments. He very readily offered me his Anatomical Obſervations. Theſe I have put at the end of the firſt Eſſay: which do not promiſe a complete diſſection of the animal, but chiefly ſhew the make of thoſe parts, which are concerned in the poiſon.

My deſign in thinking of theſe matters, was, to try how far I could carry mechanical conſiderations in accounting for thoſe ſurpriſing changes, which Poiſons make in an animal body; concluding (as I think, fairly) that if ſo abſtruſe phænomena as theſe come under the known laws of motion, it might very well be taken for granted, that the more obvious appearances in the ſame fabric are owing to ſuch cauſes, as are within the reach of geometrical reaſoning: and that therefore as the firſt ſtep towards the removal of a diſeaſe is to know its origin; ſo he is likely to be the beſt phyſician, who, having the ſame aſſiſtance of obſervations and hiſtories with others, beſt underſtands the human œconomy, the texture of the parts, motions of the fluids, and the power which other bodies have to make alterations in any of theſe.

Nor indeed ought any one to doubt of this, who conſiders that the animal compages is not an irregular maſs, and diſorderly jumble of atoms, but the contrivance of infinite wiſdom, and the maſter-piece of that creating power, who has been pleaſed to do all things by eſtabliſhed laws and rules, and that harmony and proportion ſhould be the beauty of all his works.

It were therefore heartily to be wiſhed, that thoſe gentlemen, who are ſo much afraid of introducing mathematical ſtudies, that is, demonſtration and truth, into the practice of phyſic, were ſo far at leaſt inſtructed in the neceſſary diſciplines, as to be able to paſs a true judgment, what progreſs and advances may be made this way. They would not then perhaps decry an attempt of ſo much moment to the welfare of mankind, as vain and impoſſible; becauſe it is difficult, and requires application and pains.

It is very evident, that all other methods of improving medicine have been found ineffectual, by the ſtand it was at for above two thouſand years: and that ſince, of late mathematicians have ſet themſelves to the ſtudy of it, men already begin to talk ſo intelligibly and comprehenſively, even about abſtruſe matters, that it may be hoped in a ſhort time, if thoſe, who are deſigned for this profeſſion, are early, while their minds and bodies are patient of labour and toil, initiated in the knowledge of numbers and geometry, that mathematical learning will be the diſtinguiſhing mark of a phyſician from a quack; and that he, who wants this neceſſary qualification, will be as ridiculous as one without Greek or Latin.

I have, as to what regards the animal œconomy, referred as much as I could to the works of Bellini, which have brought great light into the dark regions of phyſic, and taught us to argue clearly and conſiſtently, inſtead of amuſing ourſelves with unintelligible words of precarious hypotheſes. The Diſſertations of Dr. Pitcairne, the honour of his profeſſion in Scotland, are a convincing proof of the advantage of ſuch a mechanical way of reaſoning: nor could malice itſelf deny this, were not ignorance in confederacy with it, which will ſecure any one from being benefited by the moſt uſeful demonſtrations.

Notwithſtanding this I have been forced now and then to make digreſſions from my ſubject, to clear ſome doctrines neceſſary to be known, which have not been explained by others. For indeed the data, from which we argue in theſe matters, are by many too few. Dr. Cheyne, the author of the New Theory of Fevers, has enumerated ſeveral particulars, in which the theoric part of Medicine ſtill wants improvement. If theſe deficiencies were made good, we might with more eaſe proceed in our inquiries into human nature; and ſhould ſoon convince the world, that the moſt uſeful of arts, if duly cultivated, is more than mere conjecture, or baſe empiriciſm.

As to the authors I have made uſe of, who have treated of Poiſons, I have quoted only thoſe, who furniſhed me with matter of fact: for there are but few originals; and very large volumes on this ſubject many times contain little more than a collection of vulgar errors.

I had once thought to have carried theſe ſearches farther; in particular, beſides what is occaſionally mentioned in the laſt Eſſay concerning infection in acute diſeaſes, to have inquired into the nature of contagious and hereditary diſtempers. But the humour of ſcribling would not hold out; and ſome perhaps will ſay, 'tis well enough it did not: for I am not ignorant, how few I am like to pleaſe. If it be hard to think and write juſtly, 'tis harder yet to bring others to one's own taſte; nor ſhall I be at all angry, if to many I have afforded matter of ſatyr and invective : leſs wit ſuffices for theſe, than for the diſcovery of uſeful truths. They, who have no ſmattering of mathematical knowledge, are incompetent judges of what ſervice I have done towards the improvement of the theory, or practice of medicine : and thoſe, who are acquainted with theſe matters, will, it may be, think it ſomething to talk intelligibly on ſuch difficult and abſtruſe points. I neither want applauſe, nor fear cenſure : and therefore be the fate of theſe papers what it will, as they were firſt penned for my own ſatisfaction, and innocent entertainment ; ſo I am reſolved they ſhall never engage me in the trouble of quarrels or diſputes.

London, 1702.

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INTRODUCTION.

THOSE things, which are experienced to be in their whole nature, or in their moſt remarkable properties, ſo contrary to the animal life, as in a ſmall quantity to prove deſtructive to it, are called Poiſons: whether they are hurtful by being taken inwardly at the mouth, or communicated to the body externally by a wound.

This ſubject has afforded matter for great diſputes among philoſophers, in their inquiries into the frame of the world. Some have made it an objection to the goodneſs of the Creator, that there ſhould be any ſuch productions as Poiſons in nature: on the other hand, Paracelſus, Van Helmont, and their followers, fond of magnifying their chemical art, tell us, that Poiſons are really deſigned for other purpoſes than is commonly thought; they being indeed great medicines, when their concealed uſeful qualities are, by our ſtudy and labour, diſcovered and brought out of them [a]. To prove this, they alledge that remarkable ſaying of the wiſe man [b]: "God made not death, neither hath he pleaſure in the de-"ſtruction of the living. For he created all things, that "they might have their being; and the generations of the "world were healthful: and there is no Poiſon of deſtruction "in them, nor the kingdom of death upon the earth."

As the knowledge of thoſe minute philoſophers, who find faults in the diſpoſition of the univerſe, is generally too ſuperficial; ſo I doubt the reaſoning againſt them of our adepts, whoſe ſight is often dazzled by the light of their furnaces, will, in the preſent affair, appear too deep, and far-fetched. For it does not look like univerſal beneficence, to create ſubſtances, whoſe manifeſt and obvious qualities are noxious and deſtructive, though they may have other virtues which are ſalutary, but which are only to be extricated from them by deep ſearches of art, and the torture of the fire.

The true ſtate of the caſe ſeems to be this. The productions of nature of this kind, as to us, are often medicinal, either in the external or internal uſe of them; and experience, improved by reaſoning, teaches us to prepare and apply them to various purpoſes: but they are alſo not only phyſic, but even food to ſome other animals, which, by natural inſtinct, devour them; and theſe themſelves afford not only good nouriſhment, but ſometimes remedies to us. Little inſects, which we think troubleſome, are neceſſary to the life of wholeſome birds and other creatures. Goats and quails are fattened by hellebore [c], ſtarlings by hemlock [d], and hogs innocently eat henbane [e]; all which we call poiſonous. Many inſtances might be given of the like kind. Will any one ſay that the venom of the Viper is not made for our good, when without it (as will be obſerved in the following diſcourſe) this reptile could not have been provided with thoſe noble qualities, which render it effectual againſt ſome very ſtubborn diſeaſes?

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[a] Vid. J. B. Van Helmont opera, pag. 373.

[b] Wiſdom of Solomon, chap. i. ver. 13.

But this queſtion may perhaps ſeem more difficult with regard to poiſonous minerals: as, for inſtance, arſenic, which we find to be diffuſed almoſt through the whole mineral kingdom. Now it muſt be obſerved, that this is not a perfect mineral, but an active ſubſtance made uſe of by nature in preparing ſeveral metals in the earth, which are of great ſervice to mankind. It particularly appears to be ſo in the growth of ſilver, copper, tin and lead; the ores of all which contain, beſides common ſulphur, a great deal of arſenic: ſo that this, in the language of the chemiſts, may be called a mineraliſing principle. And the caſe will be found to be much the ſame in all natural productions of this kind.

In ſhort, there is in the fabric of the world a great chain and dependency of things upon one another: and though our knowledge does not reach to every particular link of it, yet the farther we advance in the ſtudy of nature, the more we ſhall find that

> Whatever is, is right [f].

But how much more would it appear to be ſo, could we look into the whole ſyſtem of the univerſe, and ſee the relation which our world perhaps bears to ſome of thoſe innumerable others in the Immenſe Space, which the Almighty Being may probably have made dependent upon one another by eſtabliſhed laws and order!

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[c] Lucret. lib. iv. 645.

[d] Galen. Simpl. Medic. Fac. lib. iii. c. 18.

[e] Sext. Empiric. Hypoth. Emp. i.

[f] Pope's Eſſay on Man, Epiſt. i.

As to the text cited out of Solomon, the meaning of it is plainly this. "God created nothing to be deſtructive to "mankind, but gave to all things their proper nature; and "the productions of the world are wholeſome. Even poi- "ſons were not deſigned to be hurtful, but for good uſes: "for in all the earth there are proviſions made againſt "death."

Before we proceed to particulars, it may not be improper to give a general idea of Poiſons, to explain in what manner they act, and by what alterations made in our bodies they become ſo hurtful.

Now as to this, it will appear from the following diſcourſes, that though Poiſons are of different kinds, as well thoſe which kill by wounds, as thoſe which are taken inwardly; yet there is a great agreement in the manner of producing their effects: and that even internal Poiſons exert their force in a manner analogous to the external.

Venomous animals, when they bite or ſting, inflict a wound, and inſtil into it a drop or more of liquor, which infects the fluid of the nerves, and by this means inflames the membranes: hereupon a ſwelling ariſes, ſometimes to a degree of mortification, which ſpreads to the neighbouring parts.

Poiſonous ſubſtances, being ſwallowed, wound the nervous coat of the ſtomach. An inflammation enſues, which, according as the Poiſon is of a greater or leſſer power, is communicated to the contiguous coats; and in ſome caſes, eſpecially if it be of a mineral nature, ends in a perfect gangrene. For the difference between mineral and vegetable Poiſons lies chiefly in this, that the former are of greater force than the latter.

But in all accidents of this kind, whether the wound be outward or inward, the miſchief does not ſtop at the part affected, but it is carried farther, even through the whole body.

This is done by the great activity of the nervous fluid, one part of which being infected immediately taints all the reſt: and thus the whole ſyſtem of nervous expanſions is drawn into ſpaſms and convulſions; which, according to the different offices of the parts to which the nerves belong, produce different ſymptoms. In the ſtomach and inteſtines, theſe ſpaſms cauſe ſickneſs, vomitings and gripes; in the brain, deliria, ſleepineſs and epileptic fits; in the heart, intermiſſions of the arterial pulſe, palpitations and ſwoonings; in the lungs, difficulty of breathing, with ſtrangling and ſuffocations; in the liver, by the ſpaſmodic contraction of the biliary ducts, the bile is returned into the blood, and makes a jaundice; in the kidneys, the ſame diſpoſition of the urinary canals interrupts the ſecretion of urine, and makes it quite irregular. In ſhort, the animal œconomy is all diſturbed: and though different Poiſons may ſhew their moſt remarkable effects in different parts, and theſe, according to the violence of the hurt, may appear in very different degrees; yet the ſymptoms always make it plain, that the firſt bad impreſſion is made upon the animal ſpirits.

I have in another place ſhewn, from the manner in which perſons are ſeized in peſtilential fevers, that is, with faintneſs, giddineſs, palpitations of the heart, tremblings, &c. that the nervous fluid is likewiſe principally affected in theſe diſeaſes; contagion being indeed a real Poiſon [g].

It will therefore be proper to inquire into the nature of this liquor: for I think no regard ought to be had to the immechanical notions of thoſe authors, who imagine that there is no ſuch thing in an animal body; and that muſcular motion and ſenſation are performed only by the vibrations of the fibres of the nerves, without the intervention of any ſpirituous fluid.

They, who can ſatisfy themſelves with ſuch a ſcheme, ſeem to have very little attended to what is tranſacted within us, in the effects of ſudden paſſions of the mind; in the inſtantaneous tranſlations of diſeaſes from one part to another, as particularly in the gouty humour; and in the ſurpriſing changes, made ſometimes in a moment, in the ſecretions of thoſe liquors, upon which life depends.

But, to ſay no more, as the brain is manifeſtly a large gland, with a moſt exquiſite apparatus for the ſeparation of a liquor from the blood; this muſt, like all other glands, have an excretory duct: now the nerves are evidently contrived for this purpoſe, and conſequently muſt always contain a proper ſubtile juice.

To proceed therefore; this fluid, ſo far as we can diſcover by its effects, is a thin volatile liquor, of great force and elaſticity; being indeed moſt probably a quantity of the univerſal elaſtic matter, incorporated with fine parts of the blood, ſeparated in the brain, and lodged in the fibres of the nerves. This is the inſtrument of muſcular motion and ſenſation, a great agent in ſecretions, and indeed in the whole buſineſs of the animal œconomy.

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[g] Vid. Diſcourſe on the Plague.

By the univerſal elaſtic matter I underſtand that ſubtile and active ſubſtance, diffuſed throughout the univerſe, which our great philoſopher, Sir Iſaac Newton, ſuppoſes to be the cauſe of the refraction and reflexion of the rays of light, and by the vibrations of which light communicates heat to bodies; and which readily pervading all bodies, produces many of their actions upon one another.

I refer, for the ſentiments of this divine man, to his Opticks [h]; but more eſpecially to a moſt remarkable letter of his to the honourable Mr. Boyle, written many years ſince [i]. Whoever thoroughly comprehends and conſiders what is delivered in theſe pieces, under the form of Queries and Suppoſitions, will be let into ſome knowledge of the ſecret ſprings of nature; and will then, I hope, be inclined to think, that I have not been wrong in endeavouring to introduce the ſame principles from the inanimate into the animated world.

It ſeems very reaſonable, from that uniformity, which there is in the laws of nature, to conclude that the animal ſpirits are ſomething of this kind: for there can be no greater preſumption in favour of a ſcheme, than that it is ſimple, and of a piece with the known ſyſtem of the univerſe.

Now, an active ſubſtance of this kind in the nerves, muſt neceſſarily be very ſuſceptible of alterations from other bodies of extreme minuteneſs and great force: in like manner, as we ſee ſome chemical liquors, upon their firſt approach to each other, to fall into fermentations; the reſult of which is a compound mixture of a quite different nature, from what might have been expected from the ſingle ingredients.

Thus the compound ſpirit of nitre put to oil of cloves will effervеſce even to a flame: a fermentation being indeed no more than the attraction and repulſion of the particles of different bodies, when they come together.

By reflecting upon the phænomena, which the experiments of late years made upon electricity [k] have diſcovered to the world, and viewing the attractions and repulſions of the fineſt particles of electrical ſubſtances, any one may eaſily form an idea of this animal fluid, and of the exceſſive force and velocity with which it acts.

It is very obſervable, that the communication of electricity is much greater through animal than through inanimate bodies: that is, the elaſtic fluid paſſing through theſe meets with a greater quantity of the ſame matter in them than in the other; the ſolid animal fibres being more adapted to receive it. The experiment of the boy ſuſpended on ſilk or hair lines [l] is equally ſurpriſing and inſtructive, demonſtrating this elaſtic ſpirit, even to our ſight and touch. And if the nerves, as Sir Iſaac Newtown ſuppoſes, are very ſmall, but ſolid, pellucid and uniform capillamenta, wrapt up in bundles; the glaſs tube rubbed by the hand, and its action with the elaſtic fluid, repreſent to us in ſome degree the nerves and the animal ſpirits lodged in them.

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[h] Qu. 23, 24.

[i] Publiſhed in the life of Mr. Boyle, prefixed to his works, pag. 70. which life is ſince printed by itſelf.

[k] Philoſ. Tranſact. No 366. 417. 422. 423. 426. 436. 439. 444.

Perhaps the proſecution of ſuch trials upon living creatures, may in time make us more acquainted with the laws and actions of this Impetuous Part, (as Hippocrates [m] calls it) in the animal machine.

Ita res accendunt lumina rebus [n].

It is ſufficient to our preſent purpoſe, to have deſcribed the nervous fluid ſo far, as to ſhew it to be ſuch a one as is endowed with great activity and force, and therefore capable of receiving various alterations from other bodies, eſpecially ſuch as conſiſt likewiſe of very ſubtile and powerful particles: and all Poiſons, we know, are of this kind.

I was of opinion, when I firſt wrote theſe Eſſays, that the effects of Poiſons, eſpecially thoſe from venomous animals, might be accounted for by their affecting the blood only: but the conſideration of the ſuddenneſs of their miſchief, too quick to be brought about in the courſe of the circulation, (for the bite of a Rattle-ſnake killed a dog in leſs than a quarter of a minute [o], together with the nature of the ſymptoms entirely nervous, induced me to change my ſentiments. For if, as Dr. Keil has computed [p], the velocity of the blood is more than five thouſand times leſſer as the fortieth branch from the greater artery, than it is in this artery before any ramification is made from it; how is it poſſible that the brain, heart, &c. ſhould feel ſo ſudden a hurt, unleſs it were conveyed to them by a medium of much greater quickneſs? and this can be no other than the animal ſpirits.

[l] Ibid. No 417. [m] Epidem. lib. vi. §. 8. Τὰ ἐρμῶντα σώματα.
[n] Lucret. lib. i. ver. 1110. [o] Philoſoph. Tranſact. No 399.
[p] Vid. Tent. Medico Phyſic. 2.

Neither is it amiſs to add, that the obſervations I have made, if improved, may alſo afford hints uſeful in the cure of many diſeaſes. For, though ſome of thoſe diſtempers, which we call nervous, as particularly paralytic weakneſſes, may be accounted for by irregular motions and obſtructions of the animal ſpirits only; yet many of them certainly muſt ariſe from ill affections of the ſpirituous fluid itſelf. It can, for inſtance, never be conceived that the ſurpriſing appearances in phrenitical, maniacal, and melancholy diſorders, ſhould be brought about without alterations, ſuitable to the different caſes, made in that active liquor, by which the mind governs the body.

There are many other caſes, judged extraordinary, and not eaſily to be explained, which depend almoſt ſolely on the animal ſpirits. I ſhall mention only one.

A ſurgeon of great merit and experience, in a very uſeful book, lately publiſhed [q], has obſerved, that ſometimes in gun-ſhot wounds, attended with a great laceration of the membranes, though things ſeem to go on well for ſome days; yet the patient is ſuddenly ſeized with convulſions in his face, which ſo fix the jaws that he cannot ſpeak, though the ſenſes are not impaired, and inevitably dies. It is, I think, very plain, that this dreadful ſymptom muſt be owing to the bad condition of the nervous liquor, which it is brought into by the tearing of the membranes, and which, notwithſtanding the tolerable ſtate of the blood, does, by its own diſorder, produce fatal conſequences.

And, as we ſee in the mentioned electrical experiments, how remarkably the ſubtile matter is altered in its motions and effects, even by the ſimple contact of other bodies; it muſt certainly be allowed, that when the ſame comes to be incorporated with the fineſt part of the blood, it will, according to the condition in which this is, make a fluid, elaſtic indeed, but at different times in a different degree, and therefore variouſly affected by external agents.

But to return to Poiſons: as the different ſtate of the nervous fluid may in ſome meaſure alter their effects; ſo likewiſe theſe themſelves, though really of the ſame kind, may yet ſo differ in their force and degree of action, as to be hurtful in various and ſeemingly different ways.

Upon this conſideration, the ſurpriſing ſtories related by authors, of the different deaths inflicted by Serpents of different kinds, particularly in Africa, are not at all incredible. I very well remember, that the learned Paul Herman, many years ago profeſſor of botany in the univerſity of Leyden, who had lived a great while in India, affirmed, that there were alſo in ſeveral parts of that country venomous creatures, of the ſame kind with thoſe deſcribed by the African hiſtorians, which killed by very different effects of their Poiſon: and that upon due inquiry into facts, he was convinced that the beautiful deſcriptions in Lucan [r] of the various ſpecies of Vipers, which Cato met with in the hot Libyan deſerts, were not poetical fictions, but taken from nature. He had in his muſeum, preſerved in ſpirit of wine, ſeveral of theſe very Serpents; particularly, the Aſpis, called Nintipolongha Zeylanica, whoſe bite induced a deadly ſleep; the Dipſas, or Situla Macaſſarica, which killed with an unquenchable thirſt; and the Hæmorrhous Macaſſaricus, the Poiſon of which was immediately followed by hæmorrhages from all the pores of the body.

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[q] Ranby, on gun-ſhot wounds, p. 72.

For we muſt obſerve likewiſe, that although the firſt impreſſion of the Poiſon be made upon the nervous ſpirit, yet the whole maſs of blood very quickly partakes of the hurt: not, I ſuppoſe, from any mixture of the venom with it, but from ſuch a corruption of it, as an irregular circulation, interrupted ſecretions. and ſtagnations in the ſmalleſt veſſels, (the conſequences of a vitiated nervous fluid) may naturally produce. Nor will this ſeem ſtrange, ſince ſuch a compounded liquor, as the blood is, may certainly undergo any imaginable changes by alterations made in its motion only.

Thus much concerning the general action of Poiſons: the effects of the particular kinds of them, deſcribed in the following diſcourſes, will (at leaſt in my opinion) be ſo many proofs of the truth of the doctrine I have advanced.

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[r] Lib. ix.

ESSAY I.

OF THE VIPER.

THE Viper has always been ſo remarkable for its venom, that the moſt remote antiquity made it an emblem of what is hurtful and deſtructive. Nay, ſo terrible was the nature of theſe creatures, that they were very commonly thought to be ſent as executioners of divine vengeance upon mankind for enormous crimes, which had eſcaped the common courſe of juſtice. Thus Herodotus [a] and Ælian [b] do both take notice that Adders were ſacred among thoſe maſters of learning and ſuperſtition the Egyptians: that they affirmed of one ſort of them particularly, that they were made to be miniſters of the will of the gods, by averting evil from good men, and puniſhing the bad. Therefore the goddeſs Iſis was repreſented with an Aſp upon her head [c], to denote both her wiſdom and power. And from her the Greeks and Romans honoured Minerva with the ſame ſymbol, as ſhe often appears dreſſed in antique ſtatues and gems. And Pauſanias [d] obſerves of the Arabians, that they forbore to offer any violence to the Vipers, which were found near the Balſam-tree, as reputing them holy. The footſteps of which ſuperſtition ſtill remain among theſe people to this very day: for Veſlingius [e] ſaw many of them take theſe creatures into their houſes, feed them, and worſhip them as the Genii of the place. The ſame odd fancy obtains in the Eaſt-Indies: for the king of Calicut cauſes cottages to be ſet up for Serpents to keep them from the rain, and makes it death to any that ſhall hurt one of them; thinking them to be heavenly ſpirits, becauſe they can ſo ſuddenly kill men [f]. A remarkable inſtance of ſuch an opinion as this we have in the hiſtory of St. Paul [g], whom the people of Malta, when they ſaw the Viper leap upon his hand, preſently concluded to be a murderer; and as readily made a god of him, when, inſtead of having his hand inflamed, or falling down dead, (one or other of which is uſually the effect of thoſe bites) he without any harm ſhook the beaſt into the fire: it being obvious enough to imagine, that he muſt ſtand in a near relation at leaſt to the gods themſelves, who could thus command the meſſengers of their vengeance, and counterwork the effects of ſuch powerful agents.

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[a] Lib. ii. cap. 74. [b] De Animalib. lib. xvii. c. 5. [c] Aſpide cincta comas———Valer. Flacc. Argonautic. lib. iv. ver. 418. Dextrâ lævâque ſulcis inſurgentium viperarum cohibita. Apuleius Metam. lib. ii. p. m. 240. [d] Bœtic. p. m. 303. [e] Not. in Alpin. de plant. Ægypt. cap. 14.

I have ſometimes thought that this might be the reaſon, why antiquity not only repreſented the firſt maſters of Phyſic, Hermes, Æſculapius, Hippocrates, &c. in their ſtatues and medals, with a Viper added to their figure, but alſo worſhipped them under this form: for diſeaſes in thoſe days, eſpecially the moſt violent, plagues, fevers, &c. were in like manner, as theſe creatures, reputed the commiſſioned meſſengers of divine anger and diſpleaſure [h]. They therefore, who by their art could cure and ſtop the courſe of theſe, as they were ſuppoſed to do this by the particular leave and aſſiſtance of heaven, ſo had honours paid to them accordingly; and this repreſentation was in the nature of an hieroglyphic character: for, as the learned Spanheim obſerves [i], the Viper was a ſymbol or emblem of divine power.

But to ſay the truth, that, which the ancients made the ſymbol of health, does not ſeem to have been the Viper, but the innocent Snake or Serpent of that kind, of which Lucan ſpeaks [k]:

Vos quoque qui cunctis innoxia numina terris
Serpitis, aurato nitidi fulgore dracones.

And if ſo, the reaſon Macrobius gives for this cuſtom may be a very good one; which is from the property all Serpents have of caſting their exuviæ, or upper ſkin, every year, which makes them fit emblems or repreſentations of health: the recovery whereof from ſickneſs and diſeaſes may juſtly be looked upon as the beginning of a freſh period of life, and (as the throwing off the ſenectus of theſe creatures ſeems to be) the renewing of age[l].

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[f] Purchas's Pilgrimage, book v. chap. 12.

[g] Act. Apoſt. chap. xxviii.

[h] Cornel. Celſ. præfat. in medicin. Morbos ait ad iram deorum immortalium relatos eſſe, & ab iiſdem opem poſci ſolitam.

[i] Divinæ potentiæ ſymbolum. Vid. Ezec. Spanheim. De uſu Numiſmat. p. m. 125, 126, & 181, & ſeq.

[k] Pharſal. lib. ix. ver. 729.

Be that as it will, certain it is, that ſuch fond and ſuperſtitious fancies concerning the Viper, together with the miſtaken opinion that few of its parts were exempt from poiſon, did not ſuffer the ancients to make any curious inquiries into its nature by anatomy and experiments. And this is the cauſe of the many errors they have delivered down to us in theſe points; which by gradual advances have ſince been rectified, and the inward make, properties, and generation of this animal, have been largely treated of, more eſpecially M. Redi[m], Charas[n], and Dr. Tyſon in his Diſſection of the Rattle-Snake[o], which is a larger ſpecies of the Viper, have taken pains on this ſubject, to whoſe diſcoveries what is yet wanting, we ſhall add at the end of this Eſſay.

The ſymptoms, which follow upon the bite of a Viper, when it faſtens either one or both of its greater teeth in any part of the body, are an acute pain in the place wounded, with a ſwelling at firſt red, but afterwards livid, which by degrees ſpreads farther to the neighbouring parts; with great faintneſs, and a quick, though low, and ſometimes interrupted pulſe, great ſickneſs at the ſtomach, with bilious, convulſive vomitings, cold ſweats, and ſometimes pains about the navel; and if the cure be not ſpeedy, death itſelf, unleſs the ſtrength of nature prove ſufficient to overcome theſe diſorders: and though it does, the ſwelling ſtill continues inflamed for ſome time; nay, in ſome caſes more conſiderably upon the abating of the other ſymptoms, than at the beginning. And often from the ſmall wound runs a ſanious liquor, and little puſtules are raiſed about it: the colour of the whole ſkin, in leſs than an hour, is changed yellow, as if the patient had the jaundice.

Theſe miſchiefs (although different climates, the ſeaſon of the year more or leſs hot, the greater or leſſer rage of the Viper,

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[l] Ideo ſimulacris eorum [Æſculapii & Salutis] junguntur figuræ draconum, quia præſtant ut humana corpora, velut infirmitatis pelle depoſitâ, ad priſtinum revireſcant vigorem: ut vireſcunt dracones per annos ſingulos, pelle ſenectutis exutâ. Saturnal. lib. i. c. 20.

[m] Offervazioni intorno alle vipere.

[n] Nouvelles experiences ſur la vipere.

[o] Philoſophical Tranſactions, vol. xii. N° 144.

per, the animal itſelf of a larger or ſmaller ſize, and conſequently able to communicate more or leſs venom, the wound made deeper, in a part more nervous or tendinous, and therefore receiving more of the poiſonous liquor, and the like circumſtances, may variouſly heighten or abate them, yet) uſually diſcover themſelves much after the ſame manner in all: unleſs the bite happen not to be accompanied with the effuſion of that liquor, which is the main inſtrument and cauſe of this violent and ſhocking diſturbance.

But before I proceed to inquire into the nature and manner of the acting of this juice, it may not be improper to take notice, that the true uſe of it is to perform an office of ſo great moment to the great preſervation of the individual, that without it this creature could not ſubſiſt.

For Vipers live chiefly upon lizards, frogs, toads, mice, moles, and the like animals, which they do not chew, but ſwallow down whole; in which manner they lie in the ſtomach, or if that be not big enough to receive them, partly in that, and partly in the œſophagus, which is membranous and capable of great diſtenſion; till by the ſalival juices of thoſe parts, together with the help of the fibres of the ſtomach, and the contraction of the muſcles of the abdomen, they are gradually diſſolved into a fluid ſubſtance, fit for the nouriſhment of their bodies, which is the work of many days. This is one reaſon why theſe creatures can live ſo long without taking any freſh food, which I have known them to do five or ſix months; as another is, that their blood is a groſſer and more viſcid fluid than that of moſt other animals: ſo that there is but a very little expence of it by tranſpiration, and conſequently leſs need of recruit. This not only microſcopes diſcover, but reaſon teaches: becauſe there is but very little muſcular force in the ſtomach to comminute the food, and make a chyle of fine parts; and therefore the blood muſt accordingly be of a tough and clammy conſiſtence. Beſides, the heart of a Viper has properly but one ventricle, and the circulation of the blood is performed after the ſame manner as it is in a frog and tortoiſe, in which not above one third of it paſſes through the lungs: upon which account its comminution in them by the air is proportionally leſſer than in other animals. Now ſuch a manner of feeding as this does neceſſarily require, that the prey ſhould upon the firſt catching be immediately killed: otherwiſe it were by no means fit to be let into the ſtomach. For we are not to think that the force of this part would be alone ſufficient to deſtroy it, the ſubtilty of a living creature (beſides the conſideration of the weakneſs of the fibres) being in a great meaſure able to elude that; as indeed we every day find live animals in the ventricles of others: and therefore to do this is the proper uſe both of the teeth and their poiſon; for which being deſigned and adapted, it is no wonder if the Viper, this ſame way by which it deſtroys its prey, proves ſometimes miſchievous to any other creatures beſides, when it happens to be enraged, or by any provocation ſtirred up to bite.

The deſcription of the poiſonous fangs, their make, articulation and motion, as alſo of the glands that ſeparate the yellowiſh liquor, and the bags that contain it, I ſhall give, together with ſome anatomical obſervations, at the end of this diſcourſe.

This venomous juice itſelf is of ſo inconſiderable a quantity, that it is no more than one good drop that does the execution. And for this reaſon authors have contented themſelves with trials of the bite upon ſeveral animals, never eſſaying to examine the texture and make of the liquor itſelf: for which purpoſe I have oftentimes by holding a Viper advantageouſly, and enraging it till it ſtruck out its teeth, made it bite upon ſomewhat ſolid, ſo as to void its Poiſon; which carefully putting upon a glaſs plate, I have with a Microſcope, as nicely as I could, viewed its parts and compoſition.

Upon the firſt ſight I could diſcover nothing but a parcel of ſmall ſalts nimbly floating in the liquor; but in a very ſhort time the appearance was changed, and theſe ſaline particles were now ſhot out as it were into cryſtals of an incredible tenuity and ſharpneſs, with ſomething like knots here and there, from which they ſeemed to proceed: ſo that the whole texture did in a manner repreſent a ſpider's web, though infinitely finer, and more minute; and yet withal ſo rigid were theſe pellucid ſpicula, or darts, that they remained unaltered upon my glaſs for ſeveral months[p].

I have tried ſeveral ways to find out, if I could, under what tribe of ſalts theſe cryſtals are to be ranged, and to diſcover what alterations they make in the blood: and not without ſome difficulty, by reaſon of the minute quantity of the liquor, and the hazard of experiments of this kind, ſome curious friends, and myſelf together, made the following obſervations.

About half an ounce of human blood received into a warm glaſs, in which were five or ſix grains of the Viperine Poiſon newly ejected, was not viſibly altered either in co-

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[p] Vid. Tab. i. Fig. 10.

colour or conſiſtence: it then was, and remained undiſtinguiſhable from the ſame blood, taken into another glaſs, in which was no Poiſon at all.

Theſe portions of blood were ſeverally mixed with acids and alkali's: the empoiſoned blood was, after ſuch mixtures, of the ſame colour and conſiſtence as the other.

Spirit of nitre, ſpirit of ſalt, and juice of lemons, ſeverally poured upon the ſanies itſelf, produced neither fermentation, nor any change of colour.

Salt of tartar run per deliquium, and the ſimple ſpirit of hartſhorn, dropped upon the venom, neither altered its colour, nor raiſed any ebullition.

Syrup of violets mixt with the Poiſon did not change its colour either to red or green.

The tincture of heliotropium, that is, blue paper, was not altered by the ſanies ejected upon it: and this drying ſtill retained its yellowiſh colour.

We cauſed ſeveral animals, dogs, cats, and pigeons, to be bit by an enraged Viper; which generally died, ſome in a longer, others in a ſhorter ſpace of time. But we conſtantly obſerved, that they all immediately upon the bite ſhewed, with ſigns of acute pain, marks of their life being affected by ſickneſs, faintings, convulſions, &c.

The head of a large Viper lay three hours after it was cut off: it was perfectly flaccid and without motion. A pigeon wounded upon the breaſt with the fangs of this head, was preſently convulſed, &c. as from the bite of the animal, and died in ſeven hours.

We contrived a ſharp ſteel needle to be made, crooked, in ſhape not unlike to the Viper's tooth, with a ſulcus or hollow on the convex part, not far from the point: into this we put a drop of the venom, and with it wounded the noſe of a young dog. It produced the uſual diſorders of vomiting, purging, &c. but in a leſs degree, and the dog recovered. It was remarkable, that upon making the wound the dog cried but little, till the Poiſon came into it: but then he howled, &c. in the ſame manner as if bit by the Viper itſelf. But a pigeon pricked in the fleſhy part of the breaſt by the ſame poiſoned needle, ſuffered as from the bite, and died in about eight hours.

We made theſe laſt experiments, with a view to the controverſy between Signor Redi in Italy, and Monſieur Charas in France. The former, from trials of the ſame kind with thoſe we have now mentioned, affirmed that the venom of the Viper lay in the yellow liquor of the gums. The latter, in oppoſition to this, eſpouſed a notion advanced firſt by Van Helmont, and placed it altogether in the enraged ſpirits of the creature, calling this yellow liquor a pure innocent ſaliva, and alledged in proof of his aſſertion ſeveral experiments he made, with a ſucceſs quite different from that, with which Signor Redi made his.

The moſt that can be concluded from hence, I think, is this, that although the Vipers in Italy do not differ in their nature from thoſe in France; yet there is a great deal of difference in the ſucceſs of the ſame experiments, when faithfully and judiciouſly made, and when they are cautiouſly and timorouſly managed, leſt they ſhould happen to overthrow a darling hypotheſis.

And therefore, Monſieur du Verney in the Royal Academy, and Dr. Areſkine, then at Paris, confirmed the opinion of Signor Redi, by ſeveral trials which they made with the ſame effect: as I was afterwards informed by the doctor himſelf.

We reſolved to end our poiſon-inquiries by taſting the venomous liquor. Accordingly, having diluted a quantity of it with a very little warm water, ſeveral of us ventured to put ſome of it upon the tip of our tongues. We all agreed, that it taſted very ſharp and fiery, as if the tongue had been ſtruck through with ſomething ſcalding or burning. This ſenſation went not off in two or three hours: and one gentleman, who would not be ſatisfied without trying a large drop undiluted, found his tongue ſwelled with a little inflammation, and the ſoreneſs laſted two days. But neither his nor our boldneſs was attended with any ill conſequence.

This is no objection to the hurtful quality of this juice: for as ſome chemical liquors ferment with others of a certain kind only; ſo theſe poiſonous ſalts may affect one fluid of the body, and not another. Which that is, we ſhall ſhew anon. It is ſufficient to the preſent purpoſe to ſay, that the ſaline ſpicula are broken and diſſolved in the mouth by the clammy ſalival humour: and if any of them ſhould paſs thence into the ſtomach and inteſtines, the balſam of the bile will be an antidote there, powerful enough to overcome their force.

Theſe experiments upon the Viper poiſon and the blood, are a ſufficient confirmation of what has been advanced in the Introduction, that the nervous liquor only is affected by this venom; and at the ſame time afford a convincing proof, how much thoſe ſcanty principles of our chemiſts, acid and alkali, fall ſhort in explaining the actions of natural bodies: ſince neither of theſe ſalts could in any way be found to affect the viperine venom.

Before I proceed, I muſt take notice, that even ſome of the ancients were thus far rightly appriſed of the nature of this Poiſon. Of this Galen gives us teſtimony in ſeveral places; particularly in his book De temperamentis [q], where he takes notice, that "nothing has the ſame power upon the human "body outwardly as inwardly. Thus, (ſays he) neither the "venom of the Viper, nor of the Aſp, nor frothy ſpittle of the "mad dog, are alike miſchievous when they fall upon the "ſkin, or enter into the ſtomach, as when outwardly com"municated by a wound."

And therefore Lucan, (who being an hiſtorical poet, makes amends for what is wanting of invention, by the ſpirit and judgment always ſhewn in his deſcriptions) introduces brave Cato, when marching the remains of Pompey's army through Africa, very wiſely telling the ſoldiers, almoſt choaked with thirſt, yet afraid to drink of a ſpring they came to, becauſe full of ſerpents [r]:

Noxia ſerpentum eſt admiſto ſanguine peſtis:
Morſu virus habent, & fatum dente minantur:
Pocula morte carent———

Mixt with the blood, the Serpent's Poiſon kills;
The bite conveys it; death lurks in the teeth:
Swallow'd it works no harm——

In the like manner it was in thoſe times alſo known, that the virulent juice had the ſame bad effects, when mixt with the juices of the body, by means of a common wound, as when communicated by the venomous bite. This made Celſus [s] adviſe in ſucking out the Poiſon, to take care there be no ulcer in the mouth: though this caution be rather ſlighted and ridiculed by Severinus [t] and others; who hereby diſcover how little they underſtood of the ſeat and nature of this Poiſon. And Galen [u] mentioning the ſtory of Cleopatra, relates from other authors, that ſhe killed herſelf by pouring the virus of an Aſp into a wound made in her arm by her own teeth.

In ſhort, it is upon this foundation that Pliny [x] aſſures us, the Scythians poiſoned their arrows with the ſanies of Vipers mixt with human blood. The way of doing it Ariſtotle[y] has at large related: and the Tartars are ſaid to uſe the like trick to this day. After the ſame manner the Indians make uſe of the venom of the lizard, called Gecco. This creature they hang up by the tail, and by whipping exaſperate till it diſcharge its virus, in which they tinge their darts: and a very ſlight wound with theſe weapons is ſpeedy death[z].

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[q] Lib. iii. cap. 2.

[r] Lucan. Pharſal. lib. ix. ver. 614.

[s] Loc. ante citat.

[t] Vipera Pythia, p. 361.

[u] De Theriac. ad Piſon. lib. i. c. 1. Vid. etiam c. 10.

[x] Nat. Hiſt. lib. xi. c. 53. Scythæ ſagittas tingunt viperinâ ſanie & humano ſanguine: irremediabile id ſcelus,

A later author, in his deſcription of the cape of Good Hope[a] informs us, that the way by which the inhabitants there, called Hottentots, kill great wild beaſts, lions, tigers, elephants, &c. is this: they take the bladders of Poiſon with their liquor out of the gums of that deadly kind of ſerpents, which the Portugueſe call Cobras de Capello: theſe they dry in the ſun, and grind them to powder betwixt two ſtones: this powder they make into a paſte with the ſpittle or ſlabber of the ſame creature: which paſte they rub upon the points of their darts, and lay them by to dry for their uſe.

Having in the Introduction explained in general the manner in which this Poiſon, in common with all others of the animal kind, acts upon the body; I ſhall only here add the reaſon of one particular effect of it, which is thought very extraordinary and ſurpriſing, that is, the jaundice.

The jaundice is a ſuffuſion of bile upon the ſurface of the body, and indeed upon all the inward membranes alſo. The bile is a natural ſapo, that is, a mixture of oil, water, and a ſalt both volatile and fixt, ſeparated in the liver. That the ſecretion of it may be rightly performed, it is requiſite (as in all animal ſecretions) that there be a due proportion of its ſeveral parts, and alſo that there be a right diſpoſition of the ſecretory veſſels. Theſe compounding parts cannot be ſuppoſed to be altered in ſo ſhort a time as is here mentioned: but a conſtriction, or nervous ſpaſms, may almoſt ſuddenly ſo ſtreighten the orifices of the ducts, into which the bile is to paſs, that its derivation into them will be ſtopt; and conſequently it muſt remain in the blood, which in the courſe of circulation will diſcharge it upon the whole body.

This is a jaundice of the ſame kind with that which follows ſometimes upon violent cholic pains, in which the ſpaſmodic contraction of the membranes of the abdomen interrupts the motion of the bile through the hepatic canals: the cure of which therefore is by plentiful dilution and anodyne medicines.

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[y] De mirabilibus.

[z] Bont. Hiſtor. Ind lib. 5. c. 5.

[a] Peter Kolben, printed at Norimberg, in High Dutch, 1719, pag. 532.

The caſe is quite otherwiſe in the common jaundice, which is a diſeaſe of the liver. In this the fault lies in the bile itſelf. For though it is uſually ſaid, that this is an obſtruction in the liver; yet it ought to be conſidered, that the veſſels are rarely obſtructed but by the diſorder of the liquors they carry; and conſequently, that an ill ſtate of the bile muſt be, except in ſome extraordinary caſes, antecedent to an obſtruction in its ducts: and therefore, as the alterations of ſo compounded a fluid are different, ſo the jaundice is accordingly attended with different, nay ſometimes with contrary ſymptoms. In ſome caſes, without a fever, the fæces of the inteſtines are hard and white with great coſtiveneſs: in others a diarrhœa with a fever, and yellow diſcharges, weakens the patient. In the former (the conſequent generally of an inactive ſedentary life) for want of a due quantity of ſalt, the oily part of the bile grows viſcid and thick, and ſtagnates in the ducts of the liver: in the other (owing to plentiful living, and drinking ſpirituous liquors) the volatile part of the ſalt prevails too much, and the bile becomes too thin, hot, and irritating.

There is another diſeaſe, which though it be thought to belong to another part, yet is indeed ſo much a-kin to the jaundice, that it may be properly mentioned on this occaſion, I mean the diabetes. For this is not, as phyſicians have commonly judged, a diſtemper of the kidneys, but of the liver, proceeding likewiſe from a vitiated mixture of the bile. It happens moſt frequently to thoſe, who without due exerciſe indulge themſelves in drinking vinous liquors, and then quench their thirſt ariſing from theſe, by too great a quantity of ſuch as are cooling.

By ſuch ill-timed heating and cooling of the humours of the body, the natural proportion of ſalt in the bile, by which its oily part is incorporated with the water, is not ſufficient, now the water over-abounds, to preſerve the mixture: ſo that a great portion of this, together with ſome of the thinneſt of the oil, will be diſcharged by the kidneys; and the urinary ducts will be greatly enlarged by a conſtant afflux that way. By which means the thicker oily particles are left in a degree of coagulation in the ſmaller tubes of the liver, and are there formed into a hard fatty ſubſtance.

The diſſection of thoſe, who have died of the diabetes, proves this to be ſo: for I have always found a ſteatomatus collection in their liver, in appearance not unlike to what is often diſcharged by ſtools in a confirmed jaundice, but of a harder conſiſtence.

As to the ſweetneſs of the urine, this is all bilious: for the water of the bile ſeparated from its ſalt is ſweet. Ox gall, by a chemical diſtillation, yields four parts in five of water [b]. This I have obſerved to be fragrant, as if perfumed with muſk. The urine in the beginning of a jaundice very often ſmells like violets; and in a diabetes the flux is uſually leſſened towards the latter end of life, and the water is as bitter as gall: plain indications of a like origin of two diſtempers ſeemingly very different. Neither can I omit to take notice, that the cure of a diabetes confirms theſe remarks: for this is chiefly done by ſupplying the blood with a quantity of fixt ſalt, particularly ſuch as is contained in lime water, and in that of the hot-well at Briſtol, which is indeed a natural lime-water. But what might be ſaid on this ſubject would require a juſt diſcourſe. It is time to come to the cure of the Viper-poiſon.

There was formerly in Africa a nation of people called Pſylli, famous for the cure of the bite of Serpents, with which that country above all others abounds. Theſe people were thought to have ſomething in their conſtitution ſo contrary to Poiſon, that no venomous creature would touch them: and it was pretended, that they made this a trial of the legitimacy of their children. The truth of the matter is: they performed the cure in a manner very ſurpriſing to the vulgar, that is, by applying their mouth to the wound, and ſucking out the venom. The Marſi in Italy pretended to the ſame power [c]. Some ceremonies, to over-awe the patient, and gain reverence to the operator, were added to the performance: but Celſus, the Latin Hippocrates, has wiſely obſerved, that "Theſe Pſylli had no particular ſkill in this management. but boldneſs confirmed by uſe: for the Poiſon of "the Serpent, as likewiſe ſome hunting Poiſons, which the "Gauls particularly make uſe of, are not hurtful in the "mouth, but in a wound. Therefore, whoſoever will, after their example, ſuck the wound, will be in no danger "himſelf, and will ſave the life of the wounded perſon [d]."

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[b] Vid. Haller. Not. in Boerhaav. Inſtitut. Medic. §. 99.

[c] Vid. Plin. Hiſt. Nat. lib. vii. c. 2. Ælian. Hiſt. Animal. lib. i. c. 57. Et Lucan. lib. ix. ver. 891.

[d] Neque hercule ſcientiam præcipuam habent hi, qui Pſylli nominantur, ſed audaciam uſu ipſo confirmatam. Nan venenum ſerpentis, ut quædam etiam venatoria venena, quibus Galli præcipue utuntur, non guſtu, ſed in vulnere

Ariſtotle has hinted ſomething to this purpoſe. "The ſpittle "of a man (ſays he) is an enemy to the bites of moſt Ser"pents [e]." And Nicander obſerves, "That Serpents fly "from even the ſmell of human ſpittle [f]."

Pliny expreſſes the thing ſtill in a ſtronger manner, and affirms, "That there is in all men a Poiſon, which kills Ser"pents: and that theſe creatures run away from ſpittle, as "they will from the touch of ſcalding water [g].

It may therefore juſtly ſeem ſtrange, that, upon ſo good an authority as that of Celſus, (who generally gives us the methods of the Greek phyſicians and ſurgeons) ſo beneficial and eaſy a practice as this of the Pſylli ſhould not have been perpetuated by phyſicians. But the notion, that a Poiſon ſo fatal in a wound, could not be taken into the mouth without hurt, was, no doubt, the obſtacle: eſpecially when it was imagined, that outward applications would anſwer the purpoſe as well, without any hazard.

However, this method of cure ought, I think, to be revived: and there happened, about three years ago in London, a very remarkable caſe, which confirms the ſucceſs of it.

The ſtory is this, as related to me by an ingenious and experienced ſurgeon, who ſaw the caſe at the latter end of it. A man was bit on one of his fingers by a Rattle-ſnake, juſt then brought over from Virginia. He immediately put his finger into his mouth, and ſucked the wound. His under-lip and tongue were preſently ſwelled to a great degree: he faultered in his ſpeech, and in ſome meaſure loſt his ſenſes. He then drank a large quantity of oil, and warm water upon it, by which he vomited plentifully. A live pigeon was cut in two, and applied to the finger. Two hours after this, the fleſh about the wound was cut out, and the part burnt with a hot iron, and the arm embrocated with warm oil. He then recovered his ſpeech and his ſenſes. His arm continued ſwelled the next day, but by common applications ſoon grew eaſy, and the patient ſuffered no farther miſchief

As the Poiſon of this ſnake is more quick and deadly than any other, that we know; a remedy for this will moſt certainly prove effectual againſt that of ſmaller Vipers, and all

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vulnere nocent. Ergo quiſquis, exemplum Pſylli ſecutus, id vulnus exſuxerit, & ipſe tutus erit, & tutum hominem præſtabit. Medicin. lib. v. c 27.

[e] Hiſt. Animal. lib viii. c. 29,

[f] Πολλάκι ϗ βροτέων σιάλων ὑποέτρεσαν ὀδμήν. Theriac. ver. 86.

[g] Omnibus hominibus contra ſerpentes ineſt venenum, feruntque ictum ſalivæ, ut ferventis aquæ contactum, fugere. Loc. citat.

other creatures of this kind. The other applications here made uſe of (the vomit excepted) could be of no ſervice. The pigeon; the cutting and burning the part, two hours after the wound had been made, did no good. Embrocating the arm with oil only abated the ſwelling. Therefore the phyſicians of the royal Academy at Paris gave a right judgment of this application, in a like caſe. An account having been given in our Philoſophical Tranſactions [h] of an experiment made, in which it was pretended that common oil, rubbed into the wound, had cured the bite of a Viper; they with all poſſible care made ſeveral trials with it, and pronounced it to be ineffectual; any farther than as it might be a fomentation to the tumefied part [i].

The firſt thing then to be done upon the bite of a Viper, of any kind. is that the patient ſhould immediately ſuck the wound himſelf, if he can come at it: if he cannot, another perſon ſhould do this good office for him. Whoever does it, ought (to prevent any inflammation of the lips and tongue, from the heat of the Poiſon) to waſh his mouth well beforehand with warm oil, and hold ſome of this in the mouth while the ſuction is performing.

After this is over, it will be proper to give a vomit. A doſe of Rad. Ipecacuan. encouraged in the working with oil and warm water, may be ſufficient The good effect of this is owing to the ſhake, which the action of vomiting gives to the nerves; whereby the irregular ſpaſms, into which their whole ſyſtem might be drawn, are prevented.

To confirm this practice, I have been aſſured by an ingenious ſurgeon, who lived in Virginia, that the Indians there cure the bite of the Rattle-ſnake, by ſucking the wound, and taking immediately a large quantity of a decoction of the Seneca Rattle-ſnake root, (which vomits plentifully) and laying to the part the ſame root chewed.

As to any other external management, I think it can avail but little: ſince it cannot prevent the ſudden communication of the Poiſon to the nerves. Burning the Part with a hot iron is of no uſe. Dry ſalt upon the wound, recommended by Celſus [k], promiſes ſomewhat more, but not much. The celebrated Snake-ſtones, brought from the Eaſt-Indies, and ſaid to be taken out of the head of the Cobra de Capello, have no virtue to be depended on. This Signor Redi [l], Monſieur Charas [m], and myſelf have experienced. They will indeed, when applied, ſtick to the wound for ſome time; being, as appears from their make, not natural but factitious bodies, compounded moſt probably of calcined bones, and ſome teſtaceous ſubſtances mixt together; but when they drop off, they are found to have imbibed nothing of the venom

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[h] No. 443. [i] Mem. Acad. Sc. Par. an. 1737. [k] Lib. v. c. 27. [l] Eſperienze intorno alle coſe naturali. [m] Pag. 66.

More is to be ſaid for the remedy of our Viper-catchers, in which they place ſo much confidence, as to be no more afraid of a bite than of a common puncture; immediately curing themſelves by the application of their ſpecific.

This, though they keep it as a great ſecret, I have however upon ſtrict inquiry found out to be no other than the Axungia Viperina, preſently rubbed into the wound. And to convince myſelf of its good effects, I enraged a Viper to bite a young Dog in the noſe: both the teeth were ſtruck deep in; he howled bitterly, and the part began to ſwell: I diligently applied ſome of the Axungia I had ready at hand, and he was very well the next day.

But becauſe ſome gentlemen, who ſaw this experiment, were apt to impute the cure rather to the Dog's ſpittle (he licking the wound) than to the virtue of the fat; we made him to be bit again in the tongue, forbearing the uſe of our remedy; and he died within four or five hours.

At another time I made the like trial with the ſame ſucceſs.

As this Axungia conſiſts of clammy and viſcid parts, which are withal more penetrating and active than moſt oily ſubſtances; ſo theſe, without all doubt, may, if immediately applied, involve, and as it were ſheath, the volatile ſalts of the venomous liquor, and thus prevent their ſhooting out into thoſe cryſtalline ſpicula, which we have obſerved to be the main inſtruments of that deadly miſchief, that attends the bite.

But even this cure ought not to be relied on. 'Tis ſafeſt to uſe the method we have mentioned: and moreover, if the patient feels any ſickneſs, faintneſs, or any of the nervous ſymptoms we have deſcribed; he muſt be put into bed, and a ſweat muſt be promoted by cordial medicines, particularly the Confect. Ralegh. and the ſalt of Vipers, or, in want of this, ſalt of Hartſhorn, given in warm wine. I have often experienced the good effects of this proceeding: and, after all the pretenſions of the cure by oil, in the caſe above related [n], the man was really not recovered without theſe means.

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[n] Phil. Tranſact. Nº 443.

I ſhall conclude with ſome hints, concerning the uſe of the Viper in phyſic: becauſe authors are very large in enumerating its virtues againſt many, and ſome of them very obſtinate diſtempers.

One of the firſt, whom we find in antiquity to have made uſe of the fleſh of this creature to medicinal purpoſes, was, I think, Antonius Muſa, the famous phyſician to Octavius Cæſar; of whom Pliny [o] tells us, "That when he met with "incurable ulcers, he ordered the eating of Vipers, and by "this means they were quickly healed."

It is not improbable, that he might have learned this from the great Greek phyſician Craterus, mentioned often by Cicero in his epiſtles to Atticus; who, as Porphyrius [p] relates, "very happily cured a miſerable ſlave, whoſe ſkin in a "ſtrange manner fell off from his bones, by adviſing him to "feed upon Vipers, dreſſed after the manner of fiſh."

Be this as it will, in Galen's time the profitable qualities of the Viper were commonly known. He ſays, that they, who are afflicted with the Elephantiaſis, are wonderfully relieved by eating Vipers, dreſſed like eels: and relates very remarkable ſtories of cures of this diſeaſe, performed by the Viper-wine [q].

Aratæus, who moſt probably lived about the ſame time with Galen, and of all the ancients has moſt accurately deſcribed the Elephantiaſis, commends, as Craterus did, the eating of Vipers inſtead of fiſh in the ſame diſeaſe [r]. And to this purpoſe I remember, that as Lopes [s], in his relation of the kingdom of Congo in Africa, takes notice how greedily the negroes eat adders, roaſting them, and eſteeming them as the moſt delicious food; ſo Dampier [t] alſo informs us, that the natives of Tonquin in the Eaſt-Indies treat their friends with arack, in which Snakes and Scorpions have been infuſed, accounting this not only a great cordial, but alſo an antidote againſt the leproſy, and all other ſorts of Poiſon.

I have ſince been told by a learned phyſician who reſided many years at Bengal, that it is a conſtant practice there to order in diet the Cobra de Capello (the Viper of that country) to perſons waſted by long diſtempers.

The phyſicians in Italy and France very commonly preſcribe the broth and gelly of Vipers fleſh for much the ſame uſes, that is, to invigorate and purify the maſs of blood exhauſted with diſeaſes, or tainted with ſome vicious and obſtinate ferment.

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[o] Lib. xxx. c. 13. [p] De abſtinent. ab animal. lib. i. p. 16. [q] De arte curat. ad Glauc. lib. ii. c. 10. & De ſimpl. medic. facult. lib. xi. c. 1. [r] Curat. diuturn. lib ii. c. 13. [s] Vid. Purchas's Pilgrims, part II. book vii. chap. 4. §. 3. [t] Voyages, Vol. II. part I. p. 53.

From all this it appears, that the main efficacy of the viperine fleſh is to quicken the circle of the blood, promote its due mixture, and by this means cleanſe and ſcour the glands of thoſe ſtagnating juices, which, turning to acidity, are the origin of many, at leaſt, of thoſe troubleſome diſtempers in the ſurface of the body, which go under the names of ſcrophulous, leprous, &c.

Theſe good effects are owing to that penetrating, ſtrong ſalt, with which the ſubſtance of theſe creatures does, in a very great proportion, abound; and the reaſon of this is from the food they live on, which we have obſerved before to be lizards, moles, &c. whoſe nature every one knows to be ſuch as muſt neceſſarily, when they are diſſolved in the ſtomach, ſupply the blood with a great quantity of active and volatile parts. And herein lies the difference between the fleſh of Vipers, and that of other innocent Serpents, which feeding chiefly upon graſs, herbs, &c. do not recommend themſelves to us by any of thoſe properties, which are in ſo eminent a degree found in the former.

Whoſoever reflects on what has been ſaid on this head, will very readily acknowledge, that our phyſicians deal too cautiouſly or ſparingly with a remedy, which may be applied to very good purpoſes, when they preſcribe a few grains of the powder of dried Vipers, or make up a ſmall quantity of their fleſh into Troches. Whereas, that ſervice may really be done this way, the patient ought to eat frequently of Viper gelly, or broth; or rather, as the ancient manner was, to boil Vipers, and eat them like fiſh; or if this food will not go down, (though really very good and delicious fare) to make uſe at leaſt of wine, in which dried Vipers have been digeſted ſix or ſeven days, in a gentle heat [u], from which I have ſeen very good effects in obſtinate lepra's; or laſtly, (in ſome caſes eſpecially, where wine is not convenient) to take either the powder, or good quantities of the viperine ſalt, in which alone the virtue of all medicines made from this creature reſides. And therefore the ſalt of any other animal, which is ſtill more pungent and ſtimulating than this, (as is particularly that of Cantharides) is yet a more powerful remedy in dry and ſcaly leprous eruptions; which may without any inconvenience be given in the form of a tincture made with ſpirit of wine [x].

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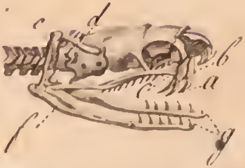
[u] Vid. Pharmacop. Lond.

[x] Vid. eand. Pharmacop.

To face Page 35.

Tab. 1.

Fig. 1.



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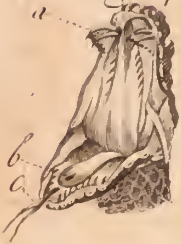


Fig. 3.

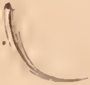
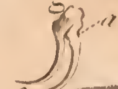


Fig. 2.



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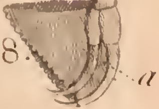
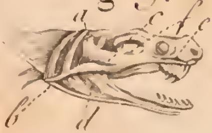


Fig. 9.



g. 10.

AN APPENDIX,

CONTAINING,

An anatomical deſcription of thoſe parts in a Viper, and in a Rattle-ſnake, which are concerned in their Poiſon : With a ſhort ACCOUNT of ſome other venomous Animals.

IN order to give a full view of the inſtruments of death in a Viper, and that larger ſpecies of it, the Rattle-ſnake, I ſhall explain the figures drawn from diſſections of them both, beginning with the leſſer animal, and ending with the bigger. And if ſome things are repeated in the latter, which had been obſerved in the former, this will not be thought tedious : becauſe in ſubjects ſo minute, it is ſometimes neceſſary to repreſent the ſame parts in different ſituations and connexions, that the uſes aſſigned to them may be the more clearly underſtood. And for this reaſon, I ſhall not follow the order of the figures, ſo much as I ſhall the thread of the deſcription, which they are deſigned to explain.

TABLE I.

Exhibits ſeveral views taken from the head of the common Viper.

Fig. 1. ſhews a ſide view of the ſkull and jaws: in which *a*. repreſents two poiſoning fangs on each ſide, fixed (in a manner to be deſcribed hereafter) in a ſolid bone on each ſide *b*. Theſe ſolid bones are articulated by a ginglymus, as it were pendent to the two zygomata : upon which, with the poiſoning fangs, they receive two motions ; viz. production, by which the fangs are erected ; and retraction, by which theſe fangs are brought in, and couched againſt the roof of the mouth, ſo as to admit of cloſing the jaws.

Fig. 5. *a*. ſhews theſe fangs magnified.

Theſe motions are produced by a thin ſlip of bone, Fig 1. *c*. and Fig. 5. *d*. which being connected to the bone *b*. below its articulation, makes it to join in the motions of production and retraction, which it receives itſelf by being connected to the bone, Fig. 5. *c*. which is produced and retracted as well in conjunction with the under jaw, to which it is connected as by the action of muſcles properly formed and ſubſervient to itſelf.

Fig. 1. *f.* ſhews the under jaw, and

d, e. its two fulcra, by the help of which it receives variety of motions neceſſary in ſwallowing its prey.

Fig. 6. ſhews theſe two fulcra *a* and *b*, by the intervention of which, the under jaw is connected to the ſinciput and temporal bone.

In order to underſtand the manner by which the Viper ſwallows its prey, it muſt be obſerved, that the upper and lower jaw on one ſide move independently of the upper and lower jaw on the oppoſite ſide; ſo as that the upper and lower on one ſide can be protruded or retracted, while the correſpondent parts on the oppoſite ſide, are either employed in contrary motions, or held firm and unmoved: and being furniſhed with ſmall teeth firmly connected to their ſurfaces, which from their office we may term holders, Fig. 1. *g.* and Fig. 5. *c.* they are capable of drawing down their prey, by alternately retracting the two jaws on each ſide.

Theſe holders are more numerous in the upper, than in the lower jaw.

Fig. 5. *c.* ſhews them in the upper jaw.

Fig. 6. *d.* ſhews them in the lower.

Fig. 4. ſhews the top of the ſkull: in which

a. The ſinciput is compoſed of one bone, which in man is formed by the concurrence of the two parietal bones: whereas the frons *b*, which in man is one bone, is in this animal divided into two by a ſuture.

c. Shews the anterior edges of the orbit of the eye formed by the frontal bone.

d. The oſſa naſi.

e. The maxillary bone in this animal no way divided.

Before we leave the bones of this part, we muſt obſerve, that the poiſoning fangs are different from the holders in other circumſtances, beſides their magnitude and motions. And firſt I muſt remark, that, though there are two poiſoning fangs on each ſide; yet it rarely happens, that they are both firmly fixed in the ſockets deſigned for their reception. I have obſerved ſometimes, that the external fang on each ſide was looſe, and ſometimes the internal fang on each ſide was looſe; and ſometimes the internal on one ſide, and the external on the other ſide were looſe: and that, in protruding the fangs, that, which was firmly fixed, was more erected, than that which was looſe; which it likewiſe always exceeded in length. From all theſe conſiderations, joined to ſome circumſtances hereafter to be explained, I have been induced to believe, that the Viper employs but one fang at a time; nature having ſo contrived, that the whole Poiſon prepared on one ſide ſhall as effectually be lodged in the prey by the action of one fang, as by both, and thus be ſufficient to anſwer its purpoſe.

As the fang of the Viper deſcribes an arch of a circle in wounding its prey, ſo its force and ſtrength are greatly ſecured by its curve form, reſembling nearly the claw of a bird, Fig. 1. *a*, and Fig. 5. *a*. But as this form is neceſſarily attended with a great difficulty, in diſengaging it again from the part, into which it is ſtruck; it muſt often happen, that its prey, in ſpringing away on being wounded, muſt break off the fang: and the rather becauſe the Viper, finding itſelf pulled away by the motions of its prey, will probably laſh about its tail; till, fixing itſelf by it, the fang is obliged either to diſengage itſelf, or to break off ſhort at the ſocket, which is its weakeſt part. To remedy this inconvenience, the fang, which before was looſe, probably ſoon becomes fixed; and the broken fang falling out, another new one is fixed (though looſely) in its place. For, to ſupply this loſs or breaking of fangs, we always find a cluſter of young fangs of different degrees of perfection, lodged in the bag near the roots of the poiſoning fangs: of which I have counted ſix on one ſide in a Rattle-ſnake. I ſhall not attempt to conjecture, by what means theſe ſubſidiary fangs are from time to time conducted to the empty ſockets; the ſeveral circumſtances mentioned being ſufficient to incline us to believe, that they ſerve for that purpoſe: as the life of the animal manifeſtly requires ſuch a ſupply for its preſervation.

Theſe poiſoning fangs are hollow from near the edge of the ſocket to near the point. This hollow begins by an orifice in the fore part of the tooth, Fig. 2. *a.* and terminates at ſome diſtance above the apex *b*; from whence the fang is exceeding hard and ſolid, and ſloped off, ſo as to reſemble in ſome meaſure, the common toothpick.

Fig. 3. repreſents this hollow of the tooth, by ſplitting it through its axis.

The apparatus for preparing and injecting the poiſonous fluid conſiſts in a gland, Fig. 9. *c.* ſituated on each cheek: in which ſituation it is firmly connected to the ſinciput at its commiſſure with the occiput by the ligament *a*, and to the poſterior extremity of the lower jaw by the ligament *b*. From theſe ligaments continued on its ſurface the gland is furniſhed with a ſtrong albugineous coat, proper to ſtrengthen it againſt the great diſtenſions, which it muſt ſuffer in accumulating its fluid, and the violent compreſſions in emitting it.

The ſame integument continued on forms the excretory duct *e*, by which the Poiſon is conveyed from the gland into the cavity of the erected fang, by the aſſiſtance of a bag or purſe, Fig. 7 and 8, *a*. in which the two poiſoning fangs are on each ſide contained.

f. Shews a ſmall white gland, which, from its ſituation near the fangs, has been ſuppoſed to be the organ for ſecreting the Poiſon: though probably it is no more than either a lymphatic, or a ſalival, gland; and is entirely wanting in the Rattle-ſnake.

All the muſcles ſubſervient to the action of biting are in this animal ſo ſituated, as to bear ſtrongly upon the poiſon gland during their action; thereby conſpiring to ejaculate its fluid.

But the chief part in this ejaculation of the Poiſon is performed by the muſcle *d*, which ariſing from the inferior maxilla runs obliquely upwards under the poiſon gland, till paſſing between the two ligaments *a* and *b*, it reflects itſelf upon the external ſide of the gland, and running parallel with its length, is firmly attached to it. By the aſſiſtance of the ligament *a*, which in ſome meaſure ſerves as its tendon, this muſcle muſt contribute to cloſing the jaws: but its greateſt action is to ſqueeze the poiſon gland, which it nearly ſurrounds; in the ſame manner as we uſually ſqueeze an orange, in order to expreſs its juice. The diſpoſition of this muſcle upon the ſurface of the gland in a continued courſe with the direction of its duct, and the terminating of this duct (which appears tendinous) at the roots of the fangs, were circumſtances, which raiſed an opinion, that this was altogether a muſcle ſubſervient to their retraction: the contrary of which will however appear by immerging the head, when excoriated in hot water; after which the muſcle will eaſily ſeparate, and leave the gland naked to view.

Fig. 7. ſhews the head of the Viper not diſſected: in which

a. Shews the two poiſoning fangs on each ſide incloſed in their proper bags, in which the different degrees of extenſion or erection, are eaſily obſerved.

b. Shews the entrance into the trachea, ſo ſituated, as to be leaſt liable to being compreſſed in the action of ſwallowing.

c. Shews

Tab. II.

Tome I. Pag. 32.

Fig. 1.

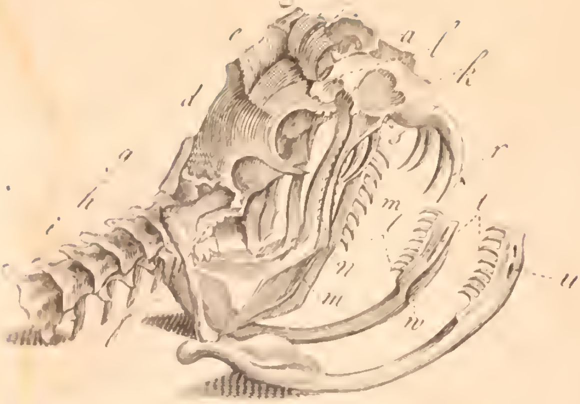


Fig. 3.

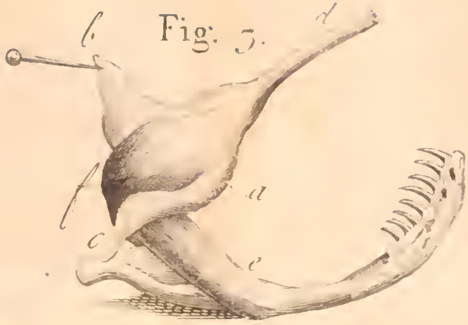


Fig. 5.

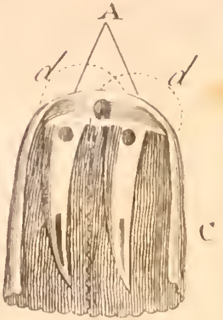


Fig. 2.

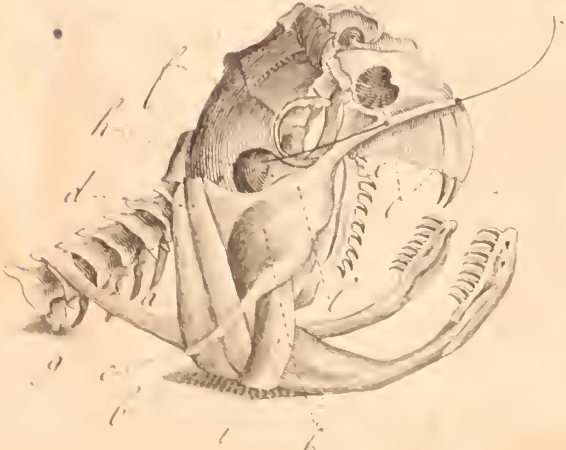
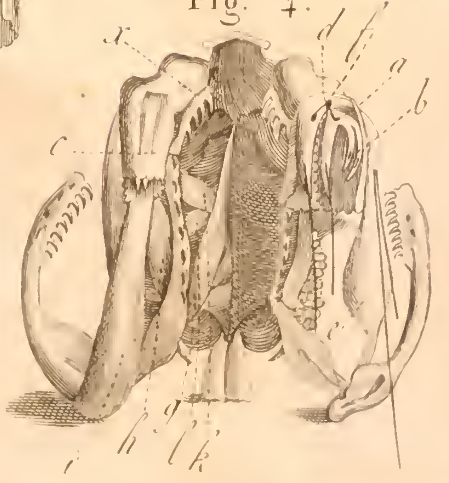


Fig. 4.



c. Shews the tongue, by which the Viper laps the dew; and by whoſe action poſſibly the ſubſidiary fangs are placed in the empty ſockets, as occaſion may require.

Fig. 8. repreſents the bag enveloping the two fangs, as it appears when conſiderably magnified; whereby the fimbriated or ſcalloped edge is more diſtinguiſhable. But the particular ſtructure and office of this bag will be better explained, by viewing it bigger in the Rattle-ſnake.

TABLE II.

Shews five views taken from the head of an exceeding large Rattle-ſnake: of which

Fig. 1. *a*. repreſents the maxillary bone.

b. The oſſa naſi.

c. The os ſphenœides.

d. The os ſincipitis.

e. The two oſſa frontis.

f. The os temporum, with the os auditûs like that of birds, but ſtanding nearly parallel to the ſpine.

g. The os occipitis.

h. and *i*. The two fulcra of the inferior maxilla.

k. The bone, in whoſe ſockets the two poiſoning fangs are received, connected by a ginglymus to

l. The zygoma.

m, *m*. The moveable bone of the upper jaw furniſhed with its holders; in which bone a joint may be obſerved at Fig. 2, *x*. at which joint it becomes curved, when

n. Fig. 1. a ſmaller ſplinter of bone, connected by one extremity to the former, and by the other to the bone containing the fangs, is ſo protruded, as to erect the fangs.

o. The poſterior extremity of the under jaw extended beyond its fulcrum, in order to increaſe the power of a ſmall muſcle ſerving to open it, Fig. 2. *g*.

p. Shews a proceſs of the under jaw analogous to the corone in other animals, into which the great elevator is inſerted.

Below this proceſs externally may be obſerved a large foramen, *q*. by which the blood veſſels and nerves enter: which, after ſupplying branches to the perioſteum and medullary ſubſtance, paſs out again at a large internal foramen, *w*. Fig. 1. leaving ſome few twigs, which proceeding further paſs out at two ſmall foramina, *u*. and are ſpent upon the gums and under lip.

t, *t*. Shew the holders in each jaw, which do not appear to be connected by a gomphotic articulation, but fixed by ligaments into ſhallow pits or inequalities deſigned for their reception.

r. Shews the poiſoning fangs fixed in their ſockets, as they appear when almoſt fully erected. For a ſupply of theſe fangs, when accidentally broke out,

s. Shews ſeveral ſubſidiary teeth of different magnitudes in their natural ſituation.

Fig. 2. Shews the ſame head, with its poiſon gland, and the ſeveral muſcles ſubſervient to the motions of the jaws, as they appear in their natural ſituation.

a. Shews a muſcle, which, by being inſerted behind its fulcrum, ſerves to open the under jaw.

b. A muſcle inſerted immediately before its fulcrum, ſerving to elevate or cloſe the jaw.

But the moſt active muſcle in cloſing the mouth and jaws ſeems to be *b*, *i*. which ariſing from the os ſincipitis, and paſſing down behind the poiſon gland, is inſerted into the under jaw at ſuch a diſtance from its fulcrum, as to have the advantage of all the other muſcles.

d and *e*. Shew the two ligaments, by which the gland is fixed to the edge of the ſinciput and the extremity of the under jaw.

l. Shews the body of the poiſon gland, covered by an albugineous coat formed by an expanſion of the two ligaments mentioned.

The ſame albugineous coat continued forms a large duct, *f*. by which the poiſonous fluid is conveyed from the gland to the bag *c*. which envelops the poiſoning fangs.

Now, although it has been obſerved, that the muſcles *b*, and *b*, *i*. are ſo ſituated as to bear againſt the gland during their action, thereby aſſiſting to expel the Poiſon ; yet the greateſt power in expelling the Poiſon ſeems to be in the action of the muſcle *k* ; which ariſing from the under jaw, and paſſing obliquely upwards behind, and in contact with the poiſon gland, reflects itſelf forward between the two ligaments ; and, after extending itſelf over almoſt the whole gland, is firmly implanted into its fore and lower part : ſerving thereby both to compreſs and contract the whole gland, and ſo to expel its fluid.

Fig. 3. gives a more diſtinct view of this gland ſurrounded by its proper muſcle.

a. Shews the poiſon gland.

b and *c*. Its two ligaments.

d. Its duct.

e and *f*. The muſcle ſurrounding it, which ſerves both to cloſe the mouth in biting, or wounding its prey, and at the ſame time to expel the Poiſon.

From this view it is obvious, why a leſs accurate examination (in ſo ſmall an animal as a Viper, and whoſe muſcles, being white, are therefore leſs diſtinguiſhable from other ſubſtances) might lead inquirers into an opinion, that the whole together was a muſcle ſending off a round tendon, and ſerving to draw the fangs inward.

Fig. 4. repreſents an under view of the ſame head: in which

a. Shews the ſuperior orifice of the poiſoning fangs in their retracted ſtate.

b. Their inferior orifice.

c. Shews the fangs as covered by their bag, when in a retracted ſtate: which bag is cut open on the oppoſite ſide, in order to ſhew the fangs. And

d. A fimbriated ſeptum attached to the orifice of the poiſon duct, and dividing the fangs from each other.

e. Shews the poiſon gland, in whoſe duct two briſtles are placed, which paſſing into the ſacculus at its ſummit, ſhew the entrance of the poiſon duct *f*, exactly between the ſuperior orifices of the two fangs: through which orifices the briſtles entering the fangs paſs out at their ſlits.

Fig. 2. *c*. Shews this bag, whoſe edge is fimbriated, when ſtretched and expanded during the erected ſtate of the fangs.

From this appearance it has been imagined, that the Poiſon being diſcharged into the bag, and the bag being gradually preſſed up to the ſummit of the fangs by the ſides of the wound, as the fangs were impelled deeper and deeper, this preſſure of the bag, acting upon its contained fluid, would be ſufficient to force and direct the Poiſon through the fangs into the bottom of the wound. But the loſs of the fluid, which would partly eſcape at the gutter neceſſarily made by the contact of two cones, and (if their contact be not very cloſe) between them too, with the waſte of ſome, which would be left in the bag, have induced me to believe, that the immiſſion of the Poiſon into the wound depends on circumſtances very different.

I have been led to think, that, to leſſen the inconvenience of breaking the fangs, one fang only, and on one ſide only, is erected at one bite, as I have before hinted; and that by being erected, its ſuperior orifice is brought nearly in contact with the orifice of the poiſon duct: and that, as the poiſon duct enters the bag exactly between the fangs, ſo the bag may ſerve to guide the duct to this or that ſide, according as this or that fang happens to be erected; thereby making the poiſon duct and the hollow of the fang one continued tube or canal.

In order to this we need only to ſuppoſe, that the fimbriated ſeptum, which divides the two fangs, is more elaſtic, or yields more eaſily, than the ſides of the bag. In this caſe the fang by its erection ſtretching the bag, the ſeptum being weakeſt will follow this ſtretch; and its extremity, to which the orifice of the poiſon duct is attached, be carried to this or that ſide, ſo as to meet this or that orifice, as the preſſure or erection may happen to be in this or that fang.

Fig. 5. Shews

A. The part of the bag, which yields with the ſeptum to the preſſure of erection in the fang.

B, and C. The ſides of the bag, which admitting no ſtretch themſelves, may throw the whole motion on the ſeptum and the part A.

d, *d*. Two arches, of either of which any neceſſary part may be deſcribed by the motion of the orifice of the duct, in conſequence of the ſeptum's yielding more eaſily than the ſides of the bag. The orifice of the duct thus changing its ſituation may be applied to the orifice of either of the fangs occaſionally, and the whole Poiſon prepared by the gland be employed in the action of one ſingle fang: the advantages of which to the Viper itſelf have been already explained.

Fig. 4. *g*, *h*, *i*, *k*, *l*. Muſcles ſubſervient to the motions of the jaws, whoſe actions ſufficiently appear by their ſituations and directions.

To this moſt accurate deſcription by Dr. Nicholls, I think it not amiſs to ſubjoin a remark, concerning the uſe of the Rattle at the tail of this Snake, which has its name from it: becauſe a vulgar error has obtained, even among the learned, about it.

It is commonly ſaid, that this is a kind contrivance of divine Providence, to give warning to paſſengers, by the noiſe which this part makes when the creature moves, to keep out of the way of its miſchief. Now this is a miſtake. It is beyond all diſpute, that wiſdom and goodneſs ſhine forth in all the works of the creation: but the contrivance here is of another kind, than is imagined.

All the parts of animals are made either for the preſervation of the individual, or for the propagation of its ſpecies:

this before us is for the ſervice of the individual. This Snake lives chiefly upon ſquirrels and birds, which a reptile can never catch without the advantage of ſome management to bring them within its reach. The way is this. The Snake creeps to the foot of a tree, and by ſhaking his Rattle, awakens the little creatures which are lodged in it: they are ſo frighted at the ſight of their enemy, who fixes his lively piercing eyes upon one or other of them, that they have no power to get away, but leap about from bough to bough, till they are quite tired; and at laſt falling to the ground, they are ſnapped into his mouth. This is by the people of the country called charming the ſquirrels and birds.

It muſt likewiſe be obſerved, that this Snake does not make any noiſe with its Rattle in the common motions of its body.

There is ſomething like this in the lion's hunting for his food. The hungry tyrant, by his terrible roaring in the woods, rouſes the leſſer beaſts out of their holes: they running about in fright and ſurpriſe, are eaſily ſeized, and become a prey to his devouring jaws.

And I have myſelf ſeen, upon a hawk's ſettling upon a tree in a garden, the little birds all about it ſo ſtruck with fear, that though they could fly backwards and forwards, for ſome little diſtance, yet they have not been able to get away from the ravenous deſtroyer.

Poisonous ANIMALS.

As the Viper is hurtful by inſtilling a liquid Poiſon into the wound made by its teeth; ſo likewiſe all venomous creatures whatſoever, whether they bite or ſting, though there be ſome difference in the contrivance of their organs, are miſchievous after much the ſame manner: and the moſt conſiderable of them for the ſame good uſe and purpoſe, that is, in order to kill their prey.

This will fully appear, by examining the inſtruments of death in ſeveral of them.

Firſt then, the Spider, which lives upon flies, waſps, and the like inſects, is provided with a hooked forceps, placed juſt by the mouth, very ſharp and fine: with this he pierces the fleſh of little creatures caught in his web, and at the ſame time infuſes a juice into the puncture; by which means the animal being killed, he ſucks out the moiſture from the body, and leaves it a dry huſky carcaſe.

Mr. Van Leeuwenhoek, in his account of Spiders, publiſhed in the Philoſophical Tranſactions [a], has, together with the other parts, by the help of his glaſſes, deſcribed theſe weapons; which he finds to lie couched on each ſide the mouth, in a row of teeth, till they are raiſed to do execution. Theſe rows of ſmall teeth are deſigned to hold the prey, that it may not eſcape the force of the bite. And in the convex part, towards the point of each claw, he has delineated a little aperture or ſlit, through which he ſuppoſes the Poiſon iſſues out at the ſame time the wound is made.

This ſituation and motion of theſe parts I have ſeveral times viewed, but was never able to diſcern the outlet or opening; which, having a juſt deference to the induſtry and application of ſo nice an obſerver in things of this nature, I, at firſt, imputed to my own unſkilfulneſs in ſuch inquiries, knowing my microſcope to be very good: till at laſt, after repeated trials, I very plainly ſaw, that nothing dropt out of the claws, which were always dry while the Spider bit; but that a ſhort white proboſcis was at the ſame time thruſt out of the mouth, which inſtilled a liquor into the wound.

Then I concluded, that Mr. Leeuwenhoek had delineated the apertures in theſe weapons, only from the analogy which he thought they muſt bear to the viperine fangs, the ſting of the ſcorpion, bee, &c. And I was confirmed in this opinion by examining a claw of the great American Spider, deſcribed by Piſo [b], and called Nhamdu: which being above fifty times bigger than that of the largeſt European Spider, if there had been any ſlit in it, my glaſs would, no doubt, have diſcovered it; but yet I found it to be quite ſolid.

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[a] No 271.

And indeed the quantity of liquor emitted by our common ſpiders, when they kill their prey, is viſibly ſo great, and the wounding weapons ſo minute, that they could contain but a very inconſiderable portion thereof, if it were to be diſcharged that way.

To this purpoſe, I remember Mr. Boyle ſomewhere tells a ſtory of a perſon blinded by a ſpider dropping its venom into his eye: which, though it can hardly find credit with ſome, is however confirmed by what Piſo relates of his Nhamdu, viz. that in catching it great heed is to be taken, leſt its Poiſon fall into the eye, this cauſing a total loſs of the ſight.

What Mr. Leeuwenhoek obſerves of the enmity theſe creatures bear to one another, I have often ſeen: for if four, five, or more be put together into a glaſs, they immediately fall to fighting with all the fury imaginable. Limbs ſtruck off are uſually the preludes to the terrible ſlaughter, which continues till all are killed, the ſurviving conqueror himſelf moſt commonly dying of his wounds.

The weapons of miſchief in the Scolopendra, or Centipes, are ſomewhat different from thoſe in the ſpider. Having had one of theſe creatures ſent to me, preſerved in ſpirit of wine, from the Eaſt-Indies, (where they are very large, and their bite is ſo painful, that, as Bontius ſays [c], it makes the patient almoſt mad) I examined the claws of its forceps by a microſcope; and in each of them obſerved a ſmall aperture, on the upper ſide near the point [d]. And Mr. Leeuwenhoek [e], who had one of the ſame kind alive, found, that by preſſing the claw, a ſmall drop of liquor iſſued out of this hole.

The caſe is much the ſame with ſtinging animals. Of theſe the Scorpion [f] is the chief, whoſe virus in different countries is more or leſs dangerous, according as it is exalted by various degrees of heat: thus in Africa particularly, its effects are ſo dreadful, that, as Joan. Leo [g] tells us, the town of Peſcara there, is in a manner left deſolate by the inhabitants in the ſummer time, by reaſon of the great abundance of theſe creatures; certain death following their ſting.

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[b] Nat. Hiſt. lib. v. cap. 10.

[c] Hiſt. nat. & med. Ind. or. lib. v. cap. 4.

[d] Vid. Tab. iii. Fig. 1 & 2.

[e] Continuatio arcanor. Natur. epiſt. 124.

[f] Tab. iii. Fig. 3.

Several of this kind Signor Redi [h] at Florence, had ſent to him from Tunis; and, it being November, he irritated them to ſting pigeons, pullets, &c. without any bad effect at all: but upon the approaching ſpring, one of them, which had been kept all the winter, nay eight months, without any food, and the wound of whoſe ſting before was harmleſs, ſtung to death two pigeons ſucceſſively; but a third and fourth wounded in like manner, ſuffered no hurt. Yet having let the Scorpion reſt all night, he killed another pigeon the next morning.

At the point of the ſting he very often could diſcern a ſmall drop of white liquor, which, when the wound was made, entered into the fleſh.

As this liquid venom is either not ſeparated from the blood into the cavity of the ſting, during the cold of winter, or at leaſt the Scorpion wants ſtrength at that time to throw it out with force and energy; ſo even in the hot months, after it is exhauſted by two or three attacks, the ſting is no longer hurtful, till the expence of this juice is recruited by time.

Viewing the ſting of one of theſe animals brought from the Eaſt-Indies, (where they are much bigger than in Africa) I could, with a glaſs, eaſily diſcover a long ſlit, on each ſide of it, near to the cuſpis, which is exactly delineated by Mr. Leeuwenhoek [i], who alſo ſaw the venom drop out of it [k].

It is very remarkable concerning this inſect, what an ingenious gentleman, who lived ſeveral years in Barbary, told me, he had many times tried; that if it be ſurrounded with a circle of burning coals, it does, upon the ſenſe of the heat, turn itſelf violently every way to make an eſcape; but finding it impoſſible, and the pain from the fire increaſing, it ſtrikes itſelf twice or thrice with the ſting on the back, and immediately dies of the wounds.

The fact has ſince been confirmed to me by others, who have aſſured me, that it is a common diverſion among the ſoldiers at Gibraltar (where theſe creatures abound) to make this experiment.

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[g] Hiſt. Afric. lib vi.

[h] Generazion. degli Inſetti, pag. 15.

[i] Lib. citat. epiſt. 123.

[k] Vid. Tab. iii. Fig. 4.

This ſelf-murder decides the controverſy among writers, whether poiſonous animals of the ſame ſpecies can kill each other. Which is not only confirmed by what we before obſerved of the Spider, but is likewiſe true of Vipers: for Dr. Herman bringing from the Indies three of the Cobras de Capello, all in one glaſs, two of them were killed in the voyage by fighting. And the learned Jo. Rhodius at Padua obſerved, that two Scorpions being put into a glaſs, they fought, and one having killed the other, devoured it [l].

As the viperine venom is the quinteſcence and moſt active part of thoſe animal juices, with which the Viper is nouriſhed; ſo is alſo that of the Scorpion: for this inſect lives chiefly upon locuſts, &c. and the ſame perſon from Barbary informed me, that ſeeing oftentimes locuſts ſticking up in the ground, as if they were ſet there, by looking he found that ſome part of them was always eat away; and that theſe places were the holes of Scorpions, who had dragged their prey thither, and fed on it as they had occaſion.

The mechaniſm of the ſting of a Bee Dr. Hooke has very accurately deſcribed [m]. One may with the naked eye ſometimes ſee it diſcharge the venom: and in this, by the help of a glaſs, I can eaſily diſcover a great number of minute ſalts floating.

And indeed this apparatus or contrivance is ſo univerſal, that we find even in vegetables ſomething analogous hereunto: for the laſt mentioned author [p] has ſhewn us, that the pricking points of nettles do, at the ſame time they pierce the ſkin, inſtil a venomous juice into the wound.

As the bites and ſtings, not only of theſe inſects we have mentioned, but alſo of ſeveral others, as hornets, waſps, gnats, &c. are often very troubleſome, and attended with more pain, inflammation and ſwelling, than would be expected from ſuch little enemies; I ſhall conclude with obſerving, that the common cure in all accidents of this kind, will be, (as in the bite of a Viper) by immediately ſucking out with the mouth the inſtilled poiſonous drop, and applying to the wound a poultice of bread and milk: but if this has been neglected, the part be fomented with warm oil and ſoft diſcutient ointments.

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[l] Not. ad Scribon. Larg. pag. 244. [m] Micrograph. Obſerv. 34. [n] Ibid. 25.

ESSAY

ESSAY II.

Of the TARANTULA.

THE ſymptoms from the bite of the Tarantula are ſo very odd and ſurpriſing, that the truth of the facts has by ſome been called in queſtion. There is reaſon for this ſuſpicion, becauſe the miſchief commonly happens to poor people; who, as they often receive charity upon it, may be tempted to diſſemble, and to act a part, as if they ſuffered what they really have not. And beſides this, hyſterical affections (as we ſhall obſerve by and by) are in this country ſometimes attended with the ſame appearances: ſo that it is hard to diſtinguiſh one caſe from the other.

However, though there are here many deceits and impoſtures, yet even theſe, I think, are an evidence to prove the point: ſince it cannot be ſuppoſed, that a diſeaſe would be counterfeited, which had never any foundation in nature.

Neither can I be perſuaded, that Baglivi, a native of the country, and a learned phyſician, (who muſt have known that tricks were played in this way) would have taken the pains to write a long diſſertation on this ſubject [a], had he not been thoroughly convinced of the reality of ſuch a Poiſon.

Beſides this, after Baglivi's book was publiſhed, Ludovicus Valetta, a Celeſtine monk of Apulia, put out at Naples a treatiſe upon this Spider [b]; in which he not only anſwers the objections of thoſe, who deny the whole thing, but gives from his own knowledge ſeveral inſtances of perſons, who had ſuffered this way: ſome of whom were of great families, and ſo far from being diſſemblers, that they would at any rate, to avoid ſhame, have concealed the misfortune, which had befallen them.

To theſe may be added the teſtimony of the Honourable Mr. Boyle, who aſſures us, that having himſelf had ſome doubts about this matter, he was, after ſtrict inquiry, convinced that the relations in the main were true [c].

I ſhall therefore, from the authentic accounts given by the two mentioned authors, extract what is moſt material and neceſſary to our preſent purpoſe.

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[a] Vid. Baglivi de Praxi Medica, & Diſſertationes, Romæ, 1696.

[b] De Phalangio Apulo opuſculum, Neapoli, 1706.

[c] Of languid and unheeded motions, chap. 6.

The Tarantula [d] is a Spider of Apulia, of the octonocular kind; that is, of that ſpecies that has eight eyes, and ſpins webs. It has eight legs, four on each ſide, and in each leg three joints. From the mouth proceed two darts, in ſhape juſt like to a hooked forceps, or crab's claws: theſe are ſolid, and very ſharp, ſo that they can eaſily pierce the ſkin. And between theſe and the fore-legs there are two little horns, which I ſuppoſe anſwer to thoſe bodies called from their uſe in flies the Feelers: becauſe as they do, ſo this creature is obſerved to move them very briſkly, when it approaches to its prey.

This, as other Spiders do, propagates its ſpecies by laying eggs, which are very numerous; ſo that there are found ſometimes in the female, when diſſected, a hundred or more: and theſe are hatched partly by the heat of the mother, partly by that of the ſun, in about twenty or thirty days time.

There is alſo a Spider of the like nature with the Tarantula in the Weſt-Indies, which Fr. Hermandez [e] deſcribes by the name of Hoitztocatl, or the pricking Spider; and ſays, that its bite induces madneſs.

In the ſummer months, eſpecially when the heats are greateſt, as in the Dog-days, the Tarantula creeping among the corn in the fields, bites the mowers and paſſengers: in the winter it lurks in holes, and is ſcarcely ſeen; and if it does bite then, it is not venomous, neither does it induce any ill ſymptoms.

But in the hot weather, although the pain of its bite is at firſt no greater, than what is cauſed by the ſting of a bee; yet the part quickly after is diſcoloured with a livid, black, or yellowiſh circle, and raiſed to an inflamed ſwelling. The patient within a few hours is ſeized with a violent ſickneſs, difficulty of breathing, univerſal faintneſs, and ſometimes trembling, with a weakneſs of the head: being aſked what the ail is, he makes no reply, or with a querulous voice, and melancholy look, points to his breaſt, as if the heart was moſt affected.

During this mournful ſcene, all the uſual alexipharmic and cordial medicines are of no ſervice: for notwithſtanding their repeated uſe, the patient growing by degrees more melancholy, ſtupid, and ſtrangely timorous, in a ſhort time expires; unleſs muſic be called to his aſſiſtance, which alone without the help of medicine, performs the cure.

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[d] Tab. iii. Fig. 5.

[e] Hiſt. Animal. Nov. Hiſpan. Tract v. cap. 5.

For at the firſt ſound of the muſical inſtrument, altho' the ſick lie, as it were, in an apoplectic fit, they begin by degrees to move their hands and feet; till at laſt they get up, and fall to dancing with wonderful vigour, at firſt for three or four hours: then they are put to bed, refreſhed from their ſweating, for a ſhort time, and repeat the exerciſe with the ſame vehemence; perceiving no wearineſs or weakneſs from it, but profeſſing they grow ſtronger and nimbler, the more they dance.

At this ſport they uſually ſpend twelve hours a day, and it continues three or four days; by which time they are generally freed from all their ſymptoms, which nevertheleſs attack them again about the ſame time the next year: and if they do not take care to prevent this relapſe by muſic, they fall into a jaundice, want of appetite, univerſal weakneſs, and ſuch like diſeaſes; which are every year increaſed, if dancing be neglected, till at laſt they prove incurable.

As muſic is the common cure, ſo they, who are bitten, are pleaſed, ſome with one ſort of it, ſome with another. One is raiſed with a pipe, another with a timbrel: one with a harp, another with a fiddle; ſo that the muſicians make ſometimes ſeveral eſſays, before they can accommodate their art to the venom: but this is conſtant and certain, notwithſtanding this variety, that they all require the quickeſt and briſkeſt tunes, and are never moved by a ſlow, dull harmony.

While the Tarantati, or affected, are dancing, they loſe in a manner the uſe of all their ſenſes, like ſo many drunkards, do many ridiculous and fooliſh tricks, talk and act obſcenely and rudely; take great pleaſure in playing with vine leaves, with naked ſwords, red cloths, and the like; and on the other hand can't bear the ſight of any thing black: ſo that if any by-ſtander happen to appear in that colour, he muſt immediately withdraw, otherwiſe they relapſe into their ſymptoms with as much violence as ever.

It may afford ſome light towards underſtanding the nature of this Poiſon, to obſerve that Apulia is the hotteſt part of all Italy, lying eaſtward, and having all the ſummer long but very little rain to temper the heats: ſo that the inhabitants breathe an air, as it were, out of a fiery furnace. Hence their temperament is dry and aduſt, as appears by their being generally lean, paſſionate, impatient, ready to action, quick-witted, very ſubject to inflammatory diſtempers, phrenſies, melancholy, and the like: upon which account there are more mad people in this, than in all the other parts of Italy. Nay, what in other countries is but a light melancholy, ariſes here to a great heighth: for women in a chloroſis ſuffer almoſt the ſame ſymptoms as perſons poiſoned by the Tarantula do, and are cured the ſame way; and in like manner the venom of the ſcorpion does here in its effects and cure agree very much with that of this ſpider.

From all this hiſtory it ſufficiently appears, that thoſe that are bitten by a Tarantula, do thereupon become delirious. In order therefore to account for the ſymptoms they ſuffer, it may not be improper to ſay ſomething concerning a delirium.

Such is the conſtitution of the human œconomy, that as upon the impreſſion of outward objects made upon the organs, and by the fluid of the nerves conveyed to the common ſenſory, different ſpecies are excited there, and repreſented to the mind; ſo likewiſe upon this repreſentation, at the command of the mind, part of the ſame fluid is determined into the muſcle, and, together with the arterial blood there, performs all the variety of voluntary motions and actions.

This order has been always ſo conſtant in us, that at length by a kind of natural habitude, without the intervention of the reaſoning faculty, repreſentations made to the mind immediately and neceſſarily produce ſuitable motions in the bodily organs. When therefore theſe repreſentations are irregular, the actions conſequent to them muſt neceſſarily be ſo too.

This being premiſed, it may perhaps be probably ſaid, that a delirium is the repreſentation and various compoſition of ſeveral ſpecies to the mind, without any order or coherence; together, at leaſt moſt commonly, with irregular, or, as it were, undeſigned motions of the body: that is, ſuch a wandering and irregular motion of the nervous fluid, whereby ſeveral objects are repreſented to the mind, and upon this repreſentation divers operations performed by the body; though thoſe objects are not impreſſed upon the organs, nor thoſe operations or motions deliberately commanded by the ſoul.

The mind indeed is the firſt principle of all muſcular motion: but in ſuch caſes as theſe, its promptitude to action or habit being ſo great, it is in a manner ſurpriſed, and cannot recover itſelf, after the ſpirits are with violent force determined purſuant to the repreſentation of the ſpecies. For, as in the former ſtate of things, a man is ſaid to act rationally, ſo this latter caſe is called a perturbation of mind, that is, a delirium; though it is very manifeſt, that in reality the defect is not in the rational, but corporeal part: ſuch ſpecies being really preſented to the mind, upon which by the order of our conſtitution ſuch motions ought to follow in the body.

Thus, for inſtance, if the liquor of the nerves is, without the preſence of any thing hurtful, put into a motion like unto that, which a painful impreſſion makes in it; the ſame bodily actions muſt enſue, as proceed from fear, anger, or the like paſſion, determining the ſpirits towards the muſcular parts. And a by-ſtander, who ſees no reaſon for ſuch a repreſentation made to the mind, will preſently conclude, that the perſon thus acting acts without or beſide his reaſon, that is, is delirious; eſpecially if the hurry and confuſion of the ſpirits be ſuch, that not only one, but ſeveral different ſpecies be at the ſame time preſented to the mind: for a man in this caſe may act the part of one joyful, angry, timorous, or the like, without any appearing reaſon, and all this almoſt in the ſame moment of time.

In one word, deliria are the dreams of thoſe who are awake. And as theſe in us ſleeping are infinitely various and wonderfully compounded, and all from the ſame common cauſe, diverſely preſſing the orifices of the nerves, and thus making different repercuſſions of their fluid; and as we all know that, in this confuſion of repreſentations to the mind, there hereupon follow (though the body ſeem now in perfect repoſe) ſuch motions in the organs, as are uſually the effect of the arbitrary determination of the ſpirits thither: ſo we are now to enquire, what alteration of the body, made by this venom, can be the occaſion of this diſorder and tumult in the nervous fluid, which excites in the party infected ſuch ſurpriſing, and almoſt contradictory repreſentations.

Moſt of the ſymptoms of thoſe, who are bitten by the Tarantula, are at the firſt, that is, before they riſe to a delirium, plainly the ſame with thoſe which the bite of a Viper induces: without doubt therefore, as we have before obſerved of the common Spider, that it pierces the fleſh with its hooked forceps, and at the ſame time inſtils from the proboſcis in the mouth a liquid venom into the wound; ſo the like claws in this [f] ſerve to make way for an active and penetrating juice emitted from the ſame part.

This fiery drop (as in the caſe of other poiſonous animals) puts the nervous liquor into a ferment: a fever enſues: the ſecretion of this fluid in the brain, and conſequently its derivation into the organs, is irregular: the impreſſions of outward objects upon the ſpirits ſo inflamed affect too ſenſibly; nay, without the action of theſe, in ſuch a diſturbed ſtate of the œconomy, ſpecies or images are preſented to the mind, which produce ſuitable, that is, irregular motions in the body.

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[f] Vid. Tab. iii. Fig. 5.

More will be ſaid to this purpoſe in the following Eſſay. For the preſent it may ſuffice to obſerve, that theſe repreſentations and actions will generally be according to the temperament of the patient; and the ſpirits will be hurried to thoſe parts, to which in time of health they have been moſt frequently determined: and every one knows which theſe are in hot countries and conſtitutions.

It will perhaps make this theory probable, to conſider that Baglivi [g], in the diſſection of a rabbit, killed by a Tarantula, found the ſubſtance of the brain, near the origin of the nerves, lightly inflamed, with livid ſpots here and there; a large quantity of extravaſated ſerum upon the brain: the effect generally of the circulation of the blood ſtopped by a fault in the ſecretion of the nervous liquor.

As to the cure, which ſeems almoſt ridiculous, we muſt take notice, that the patients have no inclination to dance, till they hear the muſic: being deſired to do it, they anſwer, it is impoſſible, they have no ſtrength. Their ſtarting up therefore, at the firſt noiſe of the inſtrument, is of a piece with their other actions: for as every thing from without has too great an effect on the nerves and their diſordered fluid; ſo ſounds, which formerly were joined to this exerciſe, and encouraged it, now excite to it with fury and violence. And the benefit of it is, that the continued motions of the limbs produce large ſweats, which, by carrying off the inflammatory particles, abate the fever raiſed in the animal ſpirits.

But beſides this, we may perhaps allow ſomewhat to the determinate force and particular modulation of the trembling percuſſions of the air, made by the muſical chords upon the elaſtic fibres in the brain: for contractile bodies may be acted upon by one certain degree of motion in the ambient fluid, though a greater degree of it, differently modified, may produce nothing of the like effect. This we ſee in the common experiment of two muſical inſtruments, tuned both to the ſame pitch: the ſtrings of the one being ſtruck, the correſpondent ſtrings of the other will ſound; and yet a much greater motion of the air, otherwiſe agitated, will not cauſe any ſenſible vibration in the ſame chords. And alſo by a trick which ſome have, of finding the tone or note peculiarly belonging to any large wine-glaſs, and by adapting their voice exactly to that tone, and making it loud and laſting, they will make the veſſel, firſt to tremble, and then burſt: which it will not do, if their voice be but a little either too low or too high [h].

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[g] Pag. 40.

Mr. Boyle relates a ſtory, from Scaliger, of a knight of Gaſcony, whom the ſound of a bag-pipe would unavoidably force to make water; though this ſecretion is regularly made by the arbitrary contraction of the muſcle of the bladder [i].

This makes it no difficult matter to conceive the reaſon, why different perſons infected with this venom, require often for their cure a different kind of muſic: their fibres having different tenſions, are not in like manner acted upon by the ſame vibrations.

The obſtinate continuing of the patients in this exerciſe is, in a great meaſure, owing to the encouragement of the by-ſtanders, and the ſtrong opinion they have of being benefited by it.

Nor are we to wonder at this practice, as odd and irrational: for muſic was anciently very much made uſe of to medicinal purpoſes; and may without doubt do very great ſervice, even by a mechanical force, in many bad diſtempers; particularly in ſome diſorders of the mind, which being always attended with irregular hurries of the ſpirits, may be quieted by exciting in them ſuch motions, as accompany the contrary paſſions.

It is plain from the hiſtory of king Saul, that this was known in very early days among the Jews. He being at times ſeized with fits of madneſs, was cured this way [k]: for the evil ſpirit from the Lord, I ſuppoſe (according to the Jewiſh manner of expreſſing extraordinary incidents) means no more than a maniacal fury, which by divine judgment he at certain times fell into.

We have a famous teſtimony to this purpoſe in Galen [l], who tells us, "that Æſculapius uſed to recover thoſe, in "whom violent motions of the mind had induced a hot temperament of body, by melody and ſongs." Pindar [m] mentions the ſame thing: and indeed from hence not only the notion, but the very name of charming [n] ſeems to have taken its origin.

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[h] Vid. Morhoſii Stentor ΥΑΛΟΚΛΑΣΤΗΣ. Kilon. 1682.

[i] Of languid and unheeded motions, chap. 6.

[k] 1 Sam. chap. 16.

[l] De Sanit. tuenda, lib. i. cap. 8.

[m] Pythior. Od. 3. μαλακαῖς ἐπαοιδαῖς. Vid. ibid. Scholia.

Thus Athenæus relates, that Theophraſtus in his book of Enthuſiaſm ſays: " Iſchiadic pains are cured, if any " one ſooth (or charm) the part by Phrygian harmony [o]." And in the like alluſive ſenſe Cælius Aurelianus calls this practice, *decantare loca dolentia*; and then adds by way of explication, that " the pain is mitigated and diſcuſſed by the " tremblings and palpitations of the part [p]." Which ſeems very well to agree with what was before remarked, concerning the mechanical force of muſic upon the elaſtic fibres of the brain, whereby the ſpirits being determined to the parts affected excite thoſe motions in them, which produce a cure. Beſides, as Athenæus here intimates, the Phrygian muſic was upon a pipe, which was the moſt vehement and briſk of all the ancients knew; ſo that indeed it was ſaid to raiſe thoſe, who heard it, to perfect fury and madneſs [q]: and ſuch we have obſerved to be requiſite for the venom of the Tarantula.

Aulus Gellius [r] not only relates this ſame cure of Iſchiadic ails, as a thing notorious enough; but adds beſides out of " Theophraſtus, that the muſic of a pipe rightly managed, healed the " bites of Vipers."

And not only does Apollonius [s] mention the cure of diſtractions of the mind, epilepſies, and ſeveral other diſtempers this ſame way; but Democritus [t] in his treatiſe of Plagues taught, " that the muſic of pipes was the medicine for many diſ" eaſes;" which Thales of Crete confirmed by his practice: for when ſent for by the Lacedæmonians to remove from them the peſtilence, he did it by the help of muſic [u].

All which inſtances evince this remedy to have been very ancient in many caſes. And indeed as Cælius Aurelianus [x] takes notice, that the firſt uſe of it was aſcribed to Pythagoras himſelf, ſo he having ſettled and founded his ſect in thoſe very parts of Italy, which are the country of the Tarantula, going then under the name of Græcia magna, now Calabria; it is not, I think, at all improbable, that he might have been the author and inventor of this practice there, which has continued ever ſince: eſpecially ſince Jamblichus affirms [y], not only that he made uſe of muſic in phyſic, but particularly that he found out and contrived ſome harmonies to eaſe the paſſions of the mind, and others for the cure of bites.

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[n] A carmine. [o] Deipnoſoph. lib. xiv. p. 624. Ἰσχιακοὺς φάσκων ἀνόσους διατελεῖν, εἰ καταυλήσοι τὶς τοῦ τόπου τῇ Φρυγιστὶ ἁρμονία. [p] Morb. chronic. lib. v. c. 1. Quæ cum ſaltum ſumerent palpitando, diſcuſſo dolore, miteſcerent. [q] Vid. Bartholin. De tibiis veter. lib. i. c. 9. [r] Noct. Atticar. lib. iv. c. 13. [s] Hiſt. Mirabil. [t] Apud Aul. Gell. loc. citat. Plurimis hominum morbis medicinam fuiſſe incentiones tibiarum. [u] Plutarc. de Muſica. [x] Loc. ante cit.

To this uſeful power of muſic, I will (to confirm my reaſonings upon it) add a remarkable inſtance of its hurtful effects, even in a brute; which an ingenious gentleman told me he once ſaw. A player on a fiddle having frequently obſerved, that a dog in the room was always ſo affected by a particular note, as to howl, and ſhew great uneaſineſs at it; one day, for experiment's ſake, continued to ſtrike the ſame note ſo long, till the ſenſible animal fell into convulſions and died.

To conclude with the Tarantula, we may take notice, that, to the return of the ſymptoms the next year, that is owing to the ſame exceſſive heat in thoſe months, acting again upon the ſmall remains of the venomous ferment. Thus Bartholin [z] relates a ſtory of a melancholy phyſician at Venice, who ſuffered the attacks of his diſeaſe only during the Dog-days, which yearly ended and returned with them: a convincing proof how great a ſhare heat has in all theſe caſes.

ESSAY III.

OF THE MAD DOG.

THE terrible effects of the Poiſon from the bite of a Mad Dog, appear after ſo different a manner in different ſubjects, that the accounts given of them by authors, being generally taken from ſingle caſes, are very different, and hardly conſiſtent with one another. The main ſymptom indeed they all agree in, that is, what they call (though improperly) the hydrophobia, or dread of water: but the diſorders, with which this is attended, are related ſo variouſly, that they can ſcarcely be thought to belong to the ſame kind of malady.

I ſhall therefore firſt deſcribe the hiſtory of this diſeaſe, from obſervations made on a conſiderable number of patients;

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[y] De Vit. Pythagor. cap. 25. πρὸς δηγμοὺς βοηθητικώτατα μέλη.

[z] Hiſtor. Anatom. Cent. 2. H. 16.

and then inquire into the reaſons, why the fatal diſtemper commonly produced by it ſhews itſelf with ſo much variety, and appears, as it were, diſguiſed in ſome caſes.

The wound from the bite of a Mad Dog, differs not at all from that made by a common bite, and is as eaſily healed: and it is uſually a conſiderable time before any bad conſequences of it appear. There are inſtances where theſe have been deferred to three, four, or ſix months; nay, ſome authors ſay, to a year and longer. Galen himſelf ſaw one caſe after a year[a]; I remember one after eleven months: but the attack is generally within thirty or forty days, though very often ſooner, ſometimes in fifteen or ſixteen days, in young ſubjects.

The firſt approaches of the diſtemper generally diſcover themſelves after this manner. A pain is felt in the part which was wounded, which by degrees ſpreads itſelf to the neighbouring parts: a laſſitude follows with uneaſineſs in all the limbs. Then the patient grows penſive and ſad, with diſturbed and unquiet ſleeps, complains of faintneſs and lowneſs of ſpirits, particularly of an oppreſſion at his breaſt. His pulſe intermits, his nerves tremble, he has cold ſweats, a great nauſea and ſickneſs at ſtomach, and loaths food: and though he has an inward heat and thirſt, and deſires to drink; yet he ſwallows meat, but eſpecially liquors, with great difficulty. Theſe ſymptoms increaſe, and the next day, from the great uneaſineſs and pain, which he finds in ſwallowing, he conceives ſuch an averſion to liquids, that at the firſt ſight of them he falls into convulſions and agonies, and cannot get down the leaſt drop. This hydrophobia has always been accounted the ſureſt ſign and mark of this Poiſon, by which it is diſtinguiſhed from all other diſeaſes, as not being obſerved, at leaſt very rarely, in any other caſe whatſoever.

At this time a fever uſually appears with a quick but low pulſe, without the leaſt ſleep, a hoarſe voice, a gathering of froth in the mouth, and ſpitting out of this upon the by-ſtanders; univerſal convulſions, particularly about the throat, and in the muſculi erectores penis, whence a continued priapiſm is obſerved. During this tragical ſcene, which always proves fatal in about two days, a delirium comes on, ſometimes with moſt terrible ſymptoms of rage and fury, and attempts of doing all poſſible miſchief even to the moſt beloved friends and relations; but more commonly without any furor, it is of the melancholy kind, and the wretch reſigns to death, and prepares for it, bids thoſe about him take care of themſelves, leſt he ſhould do them a miſchief; and begs that they would trouble him no more: and, his breath growing ſhorter and ſhorter, he expires in convulſive fits.

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[a] Comment. ii. in 1 Prorrhet. Hippocrat.

Many of the ancients have mentioned this diſeaſe, particularly Dioſcorides, Galen, Ætius, Ægineta; but none have deſcribed it ſo largely as Cælius Aurelianus[b], who, from the writings of the Greek phyſicians, (chiefly Soranus, of the methodic ſect) has collected, and put into obſcure bad Latin, all the ſymptoms of it, with great pains and exactneſs. The names of the more modern authors on this ſubject may be ſeen collected by that diligent obſerver, Stalpart Vander Wiel[c], to which may be added the learned Dr. Liſter[d].

It will afford great light towards the knowledge of the nature of this abſtruſe diſeaſe, to remark ſome odd appearances in the progreſs of it: which though with a little variety, diſcover themſelves in a greater or leſſer degree in all the unhappy patients.

It is common to them all, that they can ill bear the impreſſion of objects upon the ſenſes. All feeling is painful. The ſlighteſt touch or rubbing of the limbs hurts. The leaſt noiſe is offenſive: and the opening or ſhutting of a door affrights, as if the houſe was falling. The eyes ſo ill bear the light, that even the ſight of any thing white is intolerable. In like manner, the inward membranes are ſo tender, that they cannot ſuffer their natural ſenſation. The common coolneſs of freſh air is diſagreeable to the lungs: and the making of water gives uneaſineſs and grief in the urinary paſſages. The aſpect is diſmal, either frightful with tokens of rage and fury, or lamentable with marks of moaning and deſpair. There is no ſleep from the beginning of the fever to the end.

When the ſymptoms are maniacal, the ſtrength of the muſcles is prodigious: theſe acting indeed with a convulſive force ſo great, that I have ſeen a caſe, in which a man tied down in bed with ſtrong cords broke them all at once by one effort, and immediately died paralytic; as if all the fibres of the body had been over-ſtrained, and torn to pieces by their violent action.

As to the hydrophobia, the patient at firſt has no dread of water, nor any averſion to liquors. On the contrary, he ſees them with pleaſure: being thirſty he deſires drink; but then ſoon wonders, what ſhould be the reaſon, that he is not able to take it. He contrives ways to do it, by endeavouring to ſuck through a quill, &c. but ſoon cries out: It is impoſſible. When aſked why, he anſwers: It will not go down, it ſtrangles him, and begs to be excuſed trying any more.

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[b] De morbis acutis, lib. iii.

[c] Obſervat. rarior. Cent. i. Obſ. 100.

[d] Exercit. Medicinal.

In order to find out the cauſe of this train of dreadful events, we muſt take notice, that the rabies or madneſs in a Dog is the effect of a violent fever; and therefore it is moſt common in exceſſive hot weather, though ſometimes intenſe cold may be the cauſe of it: that no Dog ever ſweats; from whence it follows, that when his blood is in a ferment, it cannot, as in other creatures, diſcharge itſelf upon the ſurface of the body; and therefore muſt of neceſſity throw out a great many ſaline and active particles upon thoſe parts, where there is the moſt conſtant and eaſy ſecretion: and ſuch, next to the miliary in the ſkin in us, are the ſalival glands. For this reaſon much more ſpittle is ſeparated in a Dog, when mad, than at any other time, and that very frothy, or impregnated with hot ſubtile parts.

The looks of a Dog in this condition diſcover a fever. He runs wildly forward panting, ſnaps at every one he meets: his tongue hangs out of his mouth with ſlabber: his eyes are heavy, full of tears: he takes no food nor drink. In diſſecting one, who died mad, the forepart of the dura mater on the brain, about an inch above the eye-brows, was found inflamed and even ulcerated, the ulcerations piercing through this membrane, and alſo the pia mater: and upon preſſure there iſſued out from the ſmall ulcers a thin matter tinged with blood.

Now as we every day obſerve, that what is thrown out from liquors in a ferment, is capable of inducing the like motion in another liquor of the ſame kind, when duly mixed with it; ſo we may very well ſuppoſe in the preſent caſe, that the ſaliva, which is itſelf one of the moſt fermentative juices in nature, being turgid with fiery ſaline particles thrown into it out of the boiling blood, when it comes by means of a wound to be mixed with the nervous liquor in another animal, muſt neceſſarily put it into violent agitations, in the nature of a ferment, (as has been explained in the Introduction:) the conſequence of which will be, all the effects of an interrupted ſecretion in the brain, and diſturbed circulation of the blood, a fever with a delirium, convulſions, &c.

That this delirium is ſometimes maniacal, ſometimes melancholic, is owing to the different temperament and conſtitution of the patient, inclined more to paſſions of one kind or the other. As we ſee the effects of drunkenneſs are in one man good humour, mirth, and joy; in another, ill nature, malice, and rage; in a third, a mixture of ridiculous and extravagant actions; and all from the ſame common cauſe, raiſing natural diſpoſitions to a higher pitch. And we muſt likewiſe obſerve, that the huntſmen diſtinguiſh in Dogs themſelves two kinds of this diſeaſe, one of which they call the biting, the other, the ſullen madneſs.

In ſhort, this diſtemper is a fever of that kind, in which the nervous fluid is more particularly affected, from the violent action of an extraneous fiery matter mixed with it. A delirium enſues, attended, according to the diſpoſition of the body, with ſymptoms either of fury or of deſpondency, and very often with a mixture of both. For we know that theſe are frequently changed, and ſucceed to each other a mania being indeed uſually a heightened melancholy; that is, from great and continued lowneſs of ſpirits, apprehenſions of evil increaſe more and more, and the imagination is poſſeſſed with ſpecies of things moſt terrible and deſtructive: upon which the mind is neceſſarily determined to actions, which by the conſtant order of nature follow upon ſuch repreſentations. And we therefore find, that, even in common fevers, patients will ſometimes give warning of their growing furious: that is, of their perception of frightful images, which will of courſe unavoidably hurry the mind to outrageous efforts.

But the hydrophobia (though it is commonly thought to be ſo) is no part of this delirium: as will appear anon.

From the deſcription we have given, it may, I think, be concluded, that there is in all theſe caſes ſome degree of inflammation, with too great a tenſion and drineſs of the nervous membranes, and too much elaſticity and force in the fluid, with which they are filled: that by this they have acquired a preternatural ſenſibility; ſo that the uſual impreſſions of outward objects, inſtead of an agreeable feeling, give pain and uneaſineſs; and inward images are ſo ſtrong and lively, that the mind is ſurpriſed, and determines the ſpirits into the muſcular organs with an irregular impetus.

As a proof of this, the diſſection of the dead bodies generally diſcover the veſſels in the brain diſtended, the ſinus longitudinalis full of fluid blood, not coagulated, as is uſual in moſt other diſeaſes of the head: the brain itſelf, and the ſpinal marrow, drier than ordinary: the pericardium without liquor: the lungs loaded: the arteries full of blood, very fluid and hardly concreſcible in the open air: appearances all, which ſhew the animal ſpirits to have been principally affected.

The hydrophobia, we ſaid, is no part of the delirium. For the patients, being feveriſh and thirſty, do always deſire drink, as long as they can ſwallow it: at laſt they find they can neither eat nor drink, but drinking is the moſt difficult. Now the reaſon is this. This fever is of the nervous or ſpaſmodic kind: all the nerves are drawn into cramps; particularly the muſcles employed in deglutition are convulſed, their action is loſt, and it is then impoſſible to get any thing down. To aſk one in this condition to drink, is to deſire him to choak himſelf: and when he has found this to be ſo, he dreads the ſight of liquors offered to him, as much as he would a knife preſented to his throat, and ſtrives to keep them from his mouth. Liquids in ſuch a ſtate are ſwallowed with more difficulty than ſolids: becauſe the inſtruments of deglutition (which are principally, the back part of the tongue, the hinder part of the palate, and the upper part of the œſophagus) can more effectually embrace and act with their joint force upon ſolid, than upon liquid ſubſtances. And beſides this, the epiglottis (which muſt always be cloſely ſhut at this time) is more powerfully preſſed down by a ſolid, than by a liquid body. When therefore the united force of theſe parts is taken away by convulſions, ſome part of the liquids will ſlide down into the aſpera arteria: upon which a ſuffocation muſt immediately follow. This diſeaſe therefore ſhould have been called Δυσκατάποσις, a difficulty in ſwallowing; rather than Ὑδροφοβία, a dread of water.

It will ſerve both to illuſtrate and confirm this reaſoning, to take notice, that there are other diſtempers beſides this, (and all indeed of the nervous kind) in which the ſame frightful ſymptom is ſometimes obſerved. Authors [e] have remarked it in malignant fevers: and a common melancholy has been ſeen to end fatally in it [f]. I have known it, in the height of a violent hyſteric diſorder, to have continued for many hours, till the convulſive motions in the throat were quieted by proper medicines: and I remember a caſe, in which fits of a palpitation of the heart were attended with ſo great a degree of it, that it ſeemed not to differ from the true hydrophobia.

On the other hand, it has ſometimes happened, that this bite has been followed with all the other uſual ſymptoms, even to a fatal degree, and yet no hydrophobia has appeared. A learned phyſician has aſſured me, that in Shropſhire he ſaw three patients in one year, who, at the ordinary time of about thirty or forty days after the wound, all fell into ſuch nervous diſorders as have been deſcribed, a fever, delirium, oppreſſion of the breath, palpitation of the heart, ſpaſms, &c. and died on the third day: yet none of them, during this melancholy ſcene, had any difficulty of ſwallowing, or ſhewed any ſigns of a dread of liquids.

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[e] Schenckius de Venen. Animal. Salmuth. Obſerv. Cent. ii. Obſ. 52.

[f] Ephemer. German. ann. 1687.

The hydrophobia therefore is only a local convulſion, which, when the univerſal feveriſh affection of the nervous ſyſtem is come to the height, is very ſeldom abſent: but though it be, the ſpaſms of all the other parts may prove mortal. And becauſe this fever of the ſpirits is rarely ſo violent in any caſes, except the bite of a Mad Dog, as to produce a difficulty of ſwallowing; this ſymptom has been thought to be peculiar to that Poiſon.

Nothing ſeems more wonderful in this whole affair, than that the venom ſhould as it were lie latent in the body ſo long a time, before it diſcovers itſelf. Now if, as has been ſaid, the poiſonous ſaliva acts upon the nervous fluid in the manner of a ferment, it may well be conceived, that before this can have a ſenſible effect, it muſt make ſome alteration in the more ſolid fibres of the brain, by inducing perhaps that tenſion and drineſs of the membranes, which we have mentioned. This in different conſtitutions, will be done in a different ſpace of time: nay it may ſo happen, that this ferment being weak, and the conſtitution ſtrong, no viſible miſchief may enſue, till ſome accidental alteration in the body unluckily gives it an additional force: as we obſerved in the caſe of the Tarantula, how far external heat promotes the delirium.

And therefore, by parity of reaſon, the calamitous ſymptoms may ſometimes, by the concurrence of extraordinary circumſtances, be unexpectedly brought on in leſs time than any above-mentioned.

We experience every day in common nervous diſtempers, that the return and violence of the fits depend very much upon the action of things both within and without. We may add to this, that in ſome diſeaſes, in which the blood itſelf is infected, and the ſolid parts, even the bones, corrupted, the Poiſon ſeems to be hid a conſiderable time, while it is working in the body, before its laſt effect appears: as particularly in venereal caſes.

Neither will it ſeem ſtrange, that a Poiſon ſo different in its force, and ſo alterable by many circumſtances, ſhould in ſome ſubjects produce ſymptoms of the ſame convulſive kind, yet not to ſuch a degree as to hinder deglutition: and theſe too only at particular times.

A ſoldier of a ſtrong habit of body came to me not long ſince, who once a month was ſeized with a great anxiety, palpitation of the heart, and difficulty of breathing. He had been bitten by a Mad Dog about ſix weeks before he began to complain. By bleeding, cold bathing, the powder of lichen with pepper, and volatile medicines during the oppreſſion, the fits were every month leſs violent, and at laſt quite left him.

A moſt remarkable caſe of this kind was communicated to me by a perſon of unqueſtioned veracity. It was this. A gentlewoman in Yorkſhire, of the age of thirty-five years, was bit by a Mad Dog in the fore-finger: about a month after, ſhe had a pain in that part, which ſhot up to the ſhoulder, and was thought to be rheumatic. This pain returned every month, juſt a day before the full moon, laſting generally three days. After fifteen months ſhe fell into the hydrophobia, and died the third day. Her friends then recollected the bite to have happened ſo long before.

The influence of the moon in theſe caſes, I am convinced is of ſome weight. The manner of its action I have attempted to explain in another place [g]: and as the proofs there given are undeniable, and very much regard the nervous fluid; it cannot be doubted, but the ſame power may have the like effect in a diſeaſe, in which this fluid ſuffers more remarkably, perhaps, than in any other whatſoever.

Looking over the hiſtories of the many patients I have attended in this deplorable condition, I obſerve about one half of the number to have been attacked with the ſpaſms preceding the hydrophobia, either upon the full moon, or the day before it. And where this is only an influence concurring with inward cauſes of great force, it is not to be expected, but that thoſe ſhould often prevail without this external aſſiſtance.

But it is time to come to the cure, or rather the means of preventing the effects of this terrible Poiſon. For all authors agree, that, after the appearance of the hydrophobia, the caſe is almoſt deſperate: and the reaſon is plain from the deſcription we have given of it, a diſmal ſcene of the laſt ſtruggles and agonies of nature yielding up to the enemy.

The firſt care to be taken is of the wounded part. The ancient phyſicians [h], who are followed in this by the moderns,

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[g] De imperio ſolis ac lunæ.

[h] Vid Galen. de Ther. ad Piſ. l. i. c. 16. & Ætium l. vi. c. 24. & Celſum, l. v. c. 27.

derns[i], adviſe, where the place will admit of it, to enlarge the wound by inciſion; to apply a cupping glaſs; to burn it with a hot iron; and to keep a diſcharge from the ulcer by drawing medicines for many days.

I cannot but ſay, that I think all this ſeverity needleſs. The deſign of it is to draw out the Poiſon: but as it has been proved, that this immediately affects the nervous liquor, the miſchief muſt have taken place, before applications of this kind can be made.

I therefore am of opinion, (becauſe it may however be of ſome ſervice to have a continual drain from the part) that it will be ſufficient to enlarge the wound a little, and dreſs it with Ung. Baſilic. nig. adding to it a ſmall quantity of Mercur. præcip. rub. as a digeſtive.

It happens in moſt caſes, that the wound being ſmall, is healed up before the patient ſeeks for help. For this reaſon, and becauſe it is of no great conſequence whether it be cured or not, in the paper which I printed and diſperſed ſome years ſince, intitled, A certain cure for the bite of a Mad Dog, I took no notice of any outward application: the rather, becauſe I thought, if any great ſtreſs was laid upon it, it might frighten thoſe who had neglected this care; and lead them to think, that the other part of the cure would not be effectual without it. And I can ſafely affirm, that (whether any outward application was made or not) I have never known this method to fail of ſucceſs, where it has been followed before the hydrophobia began: although in the courſe of about thirty years (beſides the experience made by others, both in town and country) I have uſed it a thouſand times. I have often wiſhed, that I knew ſo certain a remedy in any other diſeaſe: I ſhall therefore give the reaſons of this method.

But before I proceed to the particulars of it, it may not be amiſs to mention the moſt conſiderable medicines, which have been formerly uſed in this caſe: for it will hence appear, that the like intentions have been purſued in all times, though by different ways.

The injudicious jumbles of Theriaca's, ſpecific antidotes, &c. whether old or new, deſerve no notice. That ridiculous preſervative, the liver of the Mad Dog, which Pliny ſays[k], ſhould be eaten rather raw than boiled, is neither good food nor phyſic. Galen[l] obſerved, that it availed nothing: and

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[i] Hildan. Obſ. Cent. i. Obſ. 87.

[k] Hiſt. nat. l. xxix. c. 5.

[l] De ſimpl. med. facult. l. ii. c. 1.

I remember to have ſeen a poor boy die mad, who had greedily devoured almoſt the whole of it.

There are two or three remedies recommended, I think, upon rational grounds. The firſt is the Cineres cancrorum fluviatilium, aſhes of the river craw-fiſh. Theſe were prepared by burning the fiſh alive upon a copper-plate, with a fire made of the cuttings of twigs of the white briony. This Galen [m] avers that no body ever made uſe of without ſucceſs: and before him Dioſcorides [n] aſſured, that it is a medicine which might be relied on. This calcined powder was given in large quantities, viz a good ſpoonful or two every day for forty days together; either alone, or rather mixed with a ſmall portion of gentian root and frankincenſe.

Another medicine is the Spongia Cynorrhodi, vel Roſæ ſylveſtris, the ſponge of the dog-roſe, which is ſo celebrated an antidote againſt this and other animal poiſons, that P. Boccone [o], who has written a whole diſcourſe upon its virtues, tells us, it is called in Sicily, Sanatodos, or all-heal.

Beſides theſe, the plant alyſſum or madwort, had its name given it by the ancients, from its great efficacy againſt this madneſs. This was of two ſorts, one deſcribed by Dioſcorides, a ſpecies of the Leucoium, the other by Galen, a Marrubium [p]. To theſe may be added garlick, agrimony, and oxylapathum.

Now it is remarkable, that all theſe remedies are powerful diuretics; the two firſt of the animal, the laſt of the vegetable kind. For, as Mr. Ray [q] has obſerved, the ſponge of the Cynorrhodon is an excreſcence formed upon the plant, as galls are upon the oak. If it be cut, 'tis found full of white worms, being the neſt of theſe inſects; which lodging here all the winter, do in the beginning of the ſpring turn to flies and quit their quarters.

All inſects abound with a diuretic ſalt: but as Cantharides do ſo more than any others, therefore the learned Baccius [r] goes farther, and, from the authority of Rhazes and Joannes Damaſcenus, adviſes to give theſe in ſubſtance for many days together. The preparation of this antidote (ſo he calls it) is by infuſing the flies in ſour butter-milk twenty-four hours, then drying them, and with the flour of lentils and wine, making them up into troches of a ſcruple weight, of which one is to be taken every day: by which means he aſſures us, that though the patient make bloody urine, yet that milk largely drank will abate that ſymptom, and that the Hydrophobia will be happily prevented. Boccone likewiſe informs us, that in Upper Hungary they give in this caſe five Cantharides in one doſe to men, and to beaſts a greater quantity [s].

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[m] De ſimpl. med. facult. l. iii. c. 34.

[n] De Theriac. c. 2.

[o] Muſeo di piante rare, Obſ. 2.

[p] Vid. Fab. Column. Phytobaſan. p. 27.

[q] Hiſt. Plant. tom. ii. p. 1471.

[r] De Venen. p. 89.

I muſt add, that Ætius [t], who has collected all the medicines he could from the old phyſicians, affirms, that himſelf knew an old man, who cured thoſe, who were bit, with common ſorrel only. He waſhed the wound with a decoction of this herb, and laid it on as a cataplaſm, and gave it in drink: by this means, the patient made a great quantity of turbid urine.

From hence it appears, that the ſureſt remedies in all ages againſt this venom have been ſuch, as provoke a great diſcharge by urine. Reflecting upon this, I thought it muſt be right to give to the public a courſe eaſily to be purſued, which by preventing the fever for a long time after the bite, and conſtantly promoting this evacuation, might ſecure the patient from danger. The method is this.

"Let the patient be blooded at the arm nine or ten ounces. "Take of the herb, called in Latin, Lichen cinereus terreſtris, in Engliſh Aſh-coloured ground liverwort, cleaned, "dried, and powdered, half an ounce. Of black pepper "powdered two drachms. Mix theſe well together, and "divide the powder into four doſes, one of which muſt be "taken every morning, faſting, for four mornings ſucceſſively, in half a pint of cow's milk warm. After theſe four "doſes are taken, the patient muſt go into the cold bath, or "a cold ſpring, or river, every morning faſting, for a month: "he muſt be dipt all over, but not ſtay in (with his head above water) longer than half a minute, if the water be very cold. After this he muſt go in three times a week for "a fortnight longer."

This powder was firſt publiſhed in the Philoſophical Tranſactions [u], from Mr. Dampier, in whoſe family it had been kept as a ſecret many years: and in the year 1721, it was, at my deſire, put into the Pharmacop. Lond. by the name of Pulvis antilyſſus. I afterwards made this alteration only, of putting two parts of Lichen to one of pepper, inſtead of equal parts, becauſe I thought it too hot: and whereas but two or three doſes of it were formerly given, I repeated it four days.

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[s] Muſeo. di fiſica. Obſerv. 21.

[t] Lib. vi. c. 24.

[u] No. 237.

The Lichen, like thoſe already mentioned, is a warm diuretic; the pepper is added, I ſuppoſe, to make it more agreeable to the ſtomach: for it is diſtaſteful and nauſeous.

This plant[x] is ſo remarkable for its virtue, that it may not be amiſs to give a deſcription of it.

Mr. Ray, ſo far as I can find, was the firſt who gave a diſtinct account of it[y], reckoning it among the Lichens. Our great botaniſt, Dr. Dillenius, has lately more exactly deſcribed it[z], and put it into the tribe of the moſſes, calling it Lichennoides digitatum cinereum, Lactucæ foliis ſinuoſis. It appears indeed to be of a ſubſtance between a fungus and a muſcus, ſoft, ſpongy and lanuginous. It grows cloſe to the ground, chiefly on heaths, and in woody, ſhady places, near the roots and ſtumps of trees; which being commonly covered with creeping, moſſy herbs, it ſticks to them when it is gathered.

It is found in all countries, and from America has been obſerved to be brought over with the Peruvian bark.

The leaves when young are ſmall, but grow to two or three inches in length, and an inch or two in breadth, divided into ſeveral ſegments. They are ſometimes ſingle, ſometimes lying upon one another. At their extremities they produce little hard, oblong bodies, which the botaniſts call Peltæ, and are undoubtedly the ſeminal capſulæ. The leaves, when dry, are aſh-coloured, darker on the upper part; on the under, lighter. Frequent veins are obſerved along them, from which here and there run ſmall white fibres into the earth, the roots of the plant.

It is found at all times of the year, eſpecially after rainy ſeaſons, that is, from autumn to winter: and therefore, as being in its freſheſt vigour, it ſhould always be gathered about that time.

I have alſo examined it by diſtillation; by which four ounces of it yielded, of an acid water one ounce, five drachms, one ſcruple, and two grains; of oil heavier than water, two drachms, one ſcruple, ſixteen grains; of coal containing fixt ſalt, one ounce, two drachms, one ſcruple, eleven grains.

But I proceed in the cure. To make this more effectual, I added the uſe of cold bathing, which had never been recommended in this manner before. The ancients, as I ſhall obſerve preſently, never applied it till the Hydrophobia appeared; and the common practice among us of ſending the patient to the neareſt ſalt water, as ſoon as may be, and there only to dip him all over twice or thrice, it is plain, cannot avail much to the prevention of a diſeaſe, which will not appear till about a month after; and therefore it ought to be continued for ſo long a time, if any advantage is to be expected from it: and I have indeed known many to have died raving, who had undergone this treatment. It is the preſſure of the water upon the ſurface of the body, and the conſtriction the cold makes upon the fibres of the ſkin and the ſmall tubes, which produce the good effect. The diſtenſion of the veſſels by the fermenting humours is hereby repreſſed, and a flux of urine promoted for ſo many days, that all danger of the nervous fever, the conſequent of the inſtilled Poiſon, is quite over. And if it ſhould be thought that ſalt water, being heavier than freſh, will preſs more; this difference, in two or three immerſions only, can be but of ſmall moment, and is abundantly compenſated by the greater coldneſs of ſprings (which are uſually choſen for this purpoſe) than is felt in the ſea.

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[x] Vid. Tab. iv. & Hiſt. Plant.

[y] Vid. Catal. Plant. Angl. ann. 1670,

[z] Hiſt. Muſcorum, pag. 200.

Thus I have made plunging into water effectual in preventing this diſeaſe, without the danger of drowning: whereas the ancients practiſed the ſame to remove it when it appeared, with ſome degree at leaſt of this hazard. For Celſus [a], who ſeems firſt to have mentioned it, and ſays it is the only remedy, adviſes, if the patient can't ſwim, to let him be kept under water, that he may ſwallow it; and then at times be lifted out of it: if he can ſwim, to hold him under by force, that he may drink whether he will or not. This in ſhort is drowning and recovering by turns. And I make no queſtion, but ſo bold a practice was grounded on the authority of the Greek phyſicians, from whoſe rich ſtores this Latin author has extracted, and digeſted into a ſmall compaſs, the beſt ſyſtem that ever was compoſed of medicine.

However it be, the famous Fan Helmont [b], in the beginning of the laſt century, having obſerved the great effects of this practice in Flanders, recommended it in a very ſtrong manner. He ſaw an old man in the Hydrophobia, cured by ſubmerſion in ſalt-water. He was firſt held under the water about four minutes, then taken out, and dipped again twice more, each time about a minute. When he was taken out, he really thought him quite dead; but being kept warm, and laid over a barrel, he vomited up the water he had ſwallowed, and recovered both his life and right ſenſes.

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[a] Unicum remedium eſt, nec opinantem in piſcinam non ante ei proviſam projicere, &, ſi natandi ſcientiam non habet, modò merſum bibere pati, modò attollere; ſi habet, interdum deprimere, ut invitus quoque aqua ſatietur: ſic enim ſimul & ſitis, & aquæ metus tollitur. Lib. v. cap. 27.

[b] Ortus Medicin. Demens idea.

He relates another remarkable ſtory of the cure of the common mania, by being drowned in freſh water; and from this rightly concludes, that it makes no difference in the caſe, whether the water be ſalt or freſh. He juſtly remarks, that great care ſhould be taken not to give over for dead thoſe who are drowned: adding two remarkable inſtances of perſons who were brought to life, after they had lain under water half an hour. And to this purpoſe I remember, that an ingenious phyſician told me, that he had, not long ſince, in the country, happened to ſave a man from the grave, who having been ſunk in a river more than twenty minutes, was judged to be paſt all hopes of recovery.

There are many accounts upon record of thoſe, who after having been drowned many hours have been brought to life [c]. This ſhould certainly encourage the uſe of all means upon ſuch accidents, eſpecially ſince the trial is not difficult. The firſt ſtep ſhould be, to blow up the ſmoak of tobacco into the inteſtines: then to warm the body by ſhaking and rolling it about, and rubbing it with warm cloaths in bed: in a word, to put the blood into motion by all manner of ways; and not to be diſcouraged, though no ſigns of life ſhould be diſcovered after an hour or two ſpent in this good work: towards the latter end of which volatile ſpirits and ſalts may have a good effect. Neither ſhould bleeding be omitted, when the blood is become warm enough to drop out of the veins.

But to return from this (I think uſeful) digreſſion to the Hydrophobia, I muſt obſerve, that if ſubmerſion in this way be put in practice, it ought to be done upon the very firſt ſigns of the ſymptom, before the fever is come to its heighth. For when it is ſo, there will not be natural ſtrength to overcome the ſhock: and I have always found, that at this time even common bathing has proved hurtful.

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[c] Vid. Diſſertation ſur l'Incertitude des ſignes de la mort. Paris, 1742.

But experiments of this kind are perhaps rather to be permitted than injoined by phyſicians, for their own ſakes; tho' it is certain, that cures more dangerous than this are every day directed: but that is generally in caſes, where it cannot ſo evidently be known, whether the patient dies by the remedy or by the diſeaſe. In ſuch kind of attempts, the danger from the trial is to be weighed againſt that from the diſeaſe: if this out-weighs, it is not only reaſonable but merciful, "even "with a kind of raſhneſs, as Celſus ſomewhere expreſſes it, "to ſnatch an opportunity of doing good[d]."

At leaſt there is more humanity in ſuch proceeding, than in ſtifling a miſerable wretch between two feather-beds: which, as I have been informed, is the practice in a neighbouring country, and ſometimes in our own.

But the greateſt comfort is, that at any time before this ſcene of horror opens, ſimple immerſion without drowning will prove effectual. For though it is beſt to begin the method preſcribed, as ſoon after the accident as it can be done; yet where it has been neglected, even till a day or two before the calamity might be expected, (as was judged from the beginning anxiety and oppreſſion of the ſpirits) the ſucceſs has been the ſame.

Before I quit this ſubject, I muſt take notice, (as I have hinted from Van Helmont) that this action of cold water upon the body, by preſſure and conſtriction, makes it of ſingular ſervice in the cure not only of acute, but alſo of chronical deliria. Doctor Willis[e] relates a very remarkable ſtory of a luſty young woman, who, having been raving mad ſeven or eight days, was by his order carried abroad at midnight, and thrown naked into a river, where ſhe ſwam about without help for more than a quarter of an hour; and taken out was put to bed, fell into a ſleep and large ſweats, and recovered without the help of any other remedy.

But there is no need of inſtances of this kind. Our phyſicians, who are moſt converſant in the cure of theſe maladies, find by daily experience, that this practice has a very conſiderable ſhare not only in recovering their patients, but alſo in preventing a relapſe into the ſame miſery.

I am therefore ſorry to read in the Philoſophical Tranſactions[f], a remark of a learned gentleman, who, upon my recommending cold bathing, propoſes rather the uſe of the hot bath: becauſe "a cold bath, he ſays, ſhuts the pores, as a "warm one opens them." Surely he ſhould have known, that the ſhutting of the pores by a ſhort cold immerſion, is naturally followed by a glowing warmth, which relaxes and opens them; and by this means promotes perſpiration, without the diſtenſion of the veſſels by an inflammatory heat. I am afraid no bathing, whether hot or cold, would clear a head poſſeſſed with ſuch immechanical notions.

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[d] Cum quadam temeritate medicamenta arripere oportet. [e] De Anima brutorum, part. partholog. cap. x. de delirio & phrenitide. [f] No 443.

To ſay no more, whoever has rightly conſidered the Bellinian theory of melancholy and maniacal diſtempers[g], will eaſily ſee the reaſon of the ſurpriſing effects of this ſafe and eaſy application, in diſpelling the greateſt calamity, to which mankind is liable.

As to all other ways of curing the Hydrophobia, I own I have not been ſo happy as to find any ſucceſs from the many I have tried. Bathing, at this time, is ineffectual. I have taken away large quantities of blood; have given opiates every three or four hours; tried volatile ſalts, aſſa fœtida, the rad. valerian. ſylv. with other antiepileptics, in large doſes; as alſo the famous Indian remedy, muſk and cinnabar; laid on bliſtering plaiſters; cooled with nitre and emulſions of barley-water, &c. All has been in vain, becauſe too late. And what is ſtill more diſcouraging is, that though ſometimes I have conquered the terrible ſymptom, and brought the patient to drink freely; yet he has died in twenty four hours with a fever and convulſions: a plain proof of what we have ſaid of the manner, in which this Poiſon operates.

However, nothing is to be omitted to the laſt, be the proſpect never ſo bad: becauſe that may ſucceed in one patient, which has not in a hundred. I have by me a letter from the learned Dr. Boerhaave, in which, with his uſual exactneſs and judgment, he relates two caſes of the Hydrophobia. In the firſt, according to the method mentioned in the Hiſtory of the Royal Academy at Paris[h], he ordered buckets of cold water to be poured, for a conſiderable time, upon the patient's head; and a clyſter, of warm water, oxymel ſimplex, and ſea-ſalt, to be injected every four hours. By theſe means he was brought to drink freely of ſmall beer, and a decoction of marſh-mallow leaves, elder-flowers, and tamarinds:

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[g] Vid. Bellin. De morbis capitis.

[h] Ann. 1699, pag. 49.

but notwithſtanding theſe hopes, he died convulſed, yet calm and in his ſenſes, in a few hours.

The other caſe had a more happy event: for though the dread of liquids was attended with foaming, roaring, and the moſt miſchievous rage; yet by large doſes of nitre, (to which laudanum and diacodium were ſometimes added); by cooling the head continually with vinegar and roſe-water; bathing the feet for one hour, every night and morning, in warm water and vinegar, with ſalt; keeping the body open by tamarinds, ſyrup of violets, and frequent clyſters of water and nitre; and laſtly, eating almoſt conſtantly lemons with a little ſugar; the poor wretch was moſt perfectly recovered.

But I muſt here obſerve, that the uſe of all theſe things was entered upon four days before the dread of water began; by which means the violence of the diſeaſe was, without doubt, very much abated: and I have great reaſon to believe, from what I have experienced, (as I have already ſaid) that the method, I have recommended, would at that time even have prevented the calamity.

To conclude, if any relief could be expected in this deſperate ſtate, I think it would be from large bleeding, even ad animi deliquium, before the fibres of the membranes and veſſels have loſt their natural force by convulſions; nitrous medicines; and plentiful diluting with cooling ſubacid liquors. But after all, it will generally happen, that (as the Greeks ſaid upon deplorable caſes) "Death will be the phyſician "that cures[1]."

ESSAY IV.

OF POISONOUS MINERALS AND PLANTS.

THOUGH there be a great variety of internal Poiſons, as well mineral as vegetable, yet they all manifeſtly agree in their primary effects and manner of operation; which

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[1] Ἰατρὸς ἰᾶται θάνατος.

(as is explained in the Introduction) are ſomewhat analogous to the miſchief from venomous bites or ſtings: the main difference lying in this, that in the one wounds are made outwardly, in the other inwardly, that is, in the ſtomach and bowels; but in both caſes, the animal œconomy ſuffers in much the ſame way.

"Poiſonous medicines, ſays Dioſcorides, are many; but "the alterations made by them in the body common, and but "few[a]."

Of all this kind, thoſe of a mineral nature are the moſt violent and deadly, the greater gravity and ſolidity of their parts giving to theſe a force and action ſurpaſſing the miſchief of vegetable juices. And therefore whereas noxious plants vary their effects in different creatures, ſo as to prove harmleſs, nay perhaps beneficial and nutritive to ſome, as we have before obſerved[b]; the ſtrength of the ſtomach in theſe animals being ſufficient to conquer and divide ſuch corroſive ſubſtances, and their blood perhaps requiring to be recruited by ſuch warm and active particles; a mineral malignity is not, at leaſt ſo far as we know, conquerable by any, but becomes univerſally hurtful and deſtructive.

We ſhall here give the firſt place to Mercury ſublimate.

This is nothing but a mixture of quickſilver with common ſalt. For, though it is always prepared with nitre and vitriol added to the ſalt, in different ways, the beſt of which is that deſcribed by Tachenius[c]; yet neither of theſe enter into the compoſition, ſerving only to facilitate the work, (which they do by uniting with the alcaline parts of the ſalt, and thus freeing its acid from them:) as abundantly appears from this experiment, that Mercury ſublimed with the ſame proportion of nitre and vitriol, without ſalt, neither receives any increaſe of its weight, nor acquires any malignant quality.

The effects of this Poiſon, when taken, are violent griping pains, with a diſtenſion of the belly; vomiting of a ſlimy, frothy matter, ſometimes mixed with blood, and ſtools of the ſame; an intolerable heat and thirſt, with cold ſweats, tremblings, convulſions, &c. as will appear from the following hiſtory[d].

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[a] Ποικίλα μὲν γὰρ τὰ δηλητήρια φάρμακα, Κοιναὶ δὲ ϗ ȣ̓ πολλαὶ αἱ ἐξ αὐτῶν γινόμεναι διαθέσεις. Alexiph. p. 399.

[b] See the Introduction.

[c] Hippocrates chymic. cap. xxiv.

[d] Wepfer De cicut. aquatic. pag. 300.

To a large dog was given a drachm of Mercury ſublimate, mixt with a little bread. Within a quarter of an hour he fell into terrible vomitings, caſting up frequently a viſcid, frothy mucus, every time more and more bloody, and purged the ſame downward: till tired and ſpent with this hard ſervice, he lay down quietly as it were to ſleep, but died the next morning.

The abdomen being opened, a great quantity of extravaſated blood was found between the liver and ſtomach, and between the duplicature of the omentum about the ſtomach; the guts as well as the ſtomach were diſtended, and full of a frothy bloody mucus: on the outſide they were of a livid colour, within all over red, and inflamed down to the very rectum. The fibrous coat of the ſtomach being taken off, between that and the nervous one, grumous blood was found in ſeveral places: the like was diſcovered here and there in the inteſtines between the ſame coats.

The ſame ſymptoms with theſe, and manifeſt ſigns of a burning corroſion followed with ulcers in the bowels, Baccius[e] obſerved in a young man poiſoned by ſublimate, mixt with his meat.

What we are here chiefly to examine is, how from ingredients ſingly innocent and harmleſs, ſo miſchievous a compound can reſult: for as the caſe is very plain with reſpect to ſalt, ſo is it likewiſe now notorious enough, that quick-ſilver itſelf, which the ancients, Dioſcorides, Galen, Pliny, &c. have unjuſtly ranked among Poiſons, is in many diſeaſes, inwardly taken, of very ſafe and beneficial uſe; and that not only when diſguiſed with ſulphur, ſugar, &c. but crude, without any correction, or vainly pretended mortification.

This the Arabian phyſicians firſt gave the hint of: Avicen[f] having obſerved, that "they, who drink it in a large "quantity, receive no hurt; its weight making a free paſ"ſage through the body." This was encouragement enough for the practice of giving whole pounds of it in the Iliac paſſion: which is oftentimes done with good ſucceſs, without any frightful ſymptom accompanying the advantage received from its ponderoſity.

Afterwards it plainly appeared that this mineral, either applied outwardly, or taken inwardly, though not in ſo great a doſe as could immediately force its way through the inteſtines, even when it was lodged for ſome time in this or that part, was not at all hurtful by any corroſive or malignant quality.

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[e] De Venen. pag. 21.

[f] Can. Medic. l. iv. Fen. 6. Argentum vivum plurimum qui bibunt, non læduntur eo: egreditur enim cum diſpoſitione ſuâ per inferiorem regionem.

I remember, that I once found ſome quantity of it in the perinæum of a ſubject taken from the gallows for a diſſection, (whoſe rotten bones diſcovered what diſeaſe had required the uſe of it, and that, I ſuppoſe, by unction) without any marks of corroſion of the part, where it was collected.

And Fallopius [g], Braſavolus [h], with others of great note, confirmed its harmleſs efficacy in the cure of the worms not only in adult perſons, but even in the more tender conſtitutions of children.

Nor are theſe the only caſes, in which good ſervice may be had from this weighty fluid. He that rightly conſiders the ſtate of the animal œconomy, the various alterations it ſuffers from the ſtagnation of its more viſcid juices in the ſmalleſt canals, and how much the impulſe and force of the circulating blood, by which obſtructions are to be removed, muſt be increaſed by its carrying along with it ſuch particles as the mercurial globuli; will perhaps ſee good reaſon to allow, that the prudent management of quick-ſilver may do that in ſome obſtinate and dangerous diſeaſes, which we cannot promiſe ourſelves from any other of our known medicines whatſoever.

But I ſhall not enlarge upon this head. The learned Dr. Cheyne has thoroughly explained the mechaniſm, by which ſuch effects as theſe are produced [i]. However, as all great medicines are to be looked upon as edge-tools, ſo this, as much as any, requires caution: and indeed more than is commonly obſerved by thoſe, who are moſt bold in the uſe of it.

For it cannot be denied, that the exceſſive gravity alone of this mineral, however ſerviceable in other reſpects, may, if it happens to lie in any quantity in the interſtices of the nervous filaments, induce ſymptoms of dangerous conſequence, as ſpaſms, contractions, palſies, &c. which we find they commonly ſuffer, who have either been for a long time employed in rubbing quick-ſilver upon looking-glaſſes, or in any work by which they are obliged to draw in mercurial fumes with their breath, or who have been too much daubed with mercurial ointments; as ſhall be obſerved anon.

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[g] De Morb. Gallic. cap. lxxvi.

[h] De Morb. Gall. inter Authores de Morb. Gall. pag. 599.

[i] New theory of continual fevers.

Neither is this all. Experience has convinced us, that repeated doſes of crude mercury have in ſome caſes, even a conſiderable time after they have been taken, exerted their force, and thrown the body into unexpected diſorders.

I remember two accidents of this kind (and one of them proved fatal,) in which when ſmall quantities had been given for many days together, a violent ſalivation enſued, more than two months after the uſe of it had been left off.

And not long ſince, I ſaw a young lady, who having ſwallowed about ſix drachms every morning, three ſucceſſive days, was ſalivated three weeks. The flux then ceaſed, but returned after ſix months, and held a month; and once more came on, in the ſame manner, two months after. The breath was each time ſtrongly affected, as is uſual in mercurial ſpittings. So ſurpriſingly active is this mineral, even ſimple and uncompounded.

We may learn from hence, that it will be always right, in dealing with this ſlippery remedy to take care that it has a free paſſage through the body; which muſt be done either by purging, or by combining it with ſubſtances, which will carry it off either by perſpiration or urine: for what is called alcaliſing it, does not deſerve the name of a preparation.

Now as to ſublimate, moſt certain it is, that the ſaline particles impart to the Mercury this noxious quality; or, to ſpeak more properly, that the ſalt receives from the mercurial corpuſcles ſuch an increaſe of its gravity and momentum, as renders its cutting corroſion more effectual and penetrating: for the manner, after which this matter is done, is probably this.

The compounding parts of the Mercury, though ſo minutely divided by the action of the fire, as to riſe in the form of a fume, yet are ſtill ſolid and ponderous bodies: and by reaſon of their extreme parvity, being perhaps ſimple and elementary corpuſcles, they will eaſily be lodged in the pores and interſtices of the ſaline cryſtals; which being compoſed of the atoms of ſalt, variouſly by ſublimation combined and united, are a kind of cutting lamellæ or blades; the force of which could never have been very penetrating, upon the account of their lightneſs and eaſy diſſolution, if the Mercury, without blunting their edge, or breaking their figure, did not lend them an additional weight, and thus at the ſame time ſtrengthen their action, and prevent their quick ſolution by the juices of the ſtomach: which cannot now disjoin their compounding parts, becauſe the vacuities, into which they ſhould, in order to do this, inſinuate themſelves, are already poſſeſſed, and taken up by the mercurial globules.

In ſhort, theſe cryſtals, which are to be conſidered as ſo many ſharp knives or daggers, wounding and ſtabbing the tender coats of the ſtomach, and abraiding their natural mucus, will irritate the nervous liquor: upon which convulſions and vomitings, with exceſſive pains, muſt follow. And the blood veſſels being at the ſame time pricked, all the adjacent parts will be inflamed, the blood will ſtagnate: then come on ulcers, which, though ſingly ſmall, yet being many in number, do all together make up large gangrenes.

This being the nature of ſublimed Mercury, it may not be amiſs to enquire, how it comes to paſs, that this ſame compound reſublimed with live Mercury in the proportion of four parts to three, (for the ſublimate will not take up an equal quantity) eſpecially if the work be repeated three or four times, loſes its corroſiveneſs to that degree as to become not only a ſafe, but, in many caſes, a noble medicine. For I do not ſee, that any of the chemical writers have hit upon the true ſolution of this phænomenon.

Here then it is to be conſidered, that the action of the ſaline cryſtals depending upon their ſolidity and largeneſs, theſe muſt neceſſarily, by every ſubſequent ſublimation, be broken into ſmaller and ſmaller parts. The mercurial globules, (for the reaſons given by the author of the forementioned Theory of Fevers) ariſing more quickly and eaſily than the ſalts, quit the interſtices in which they were lodged, and the cryſtalline blades are divided every time more and more by the force of the fire: whereupon a new combination of parts ſucceeds. And although there be a greater proportion of the mineral to the ſalts than before, which makes dulcified Mercury ſpecifically heavier than the corroſive, (for this contains two parts of ſalt, and one of Mercury; whereas the dulcified, well prepared, has equal parts) yet the broken pieces of the cryſtals uniting into little maſſes of differing figures from their former make, thoſe cutting points are now ſo much ſmaller, that they cannot make wounds deep enough to be equally miſchievous and deadly; and therefore do only vellicate and twitch the ſenſible membranes of the ſtomach to that degree, as excites them to an excretion of their contents and glandular juices, upward or downward, according as the force of irritation is greater or leſs.

Thus a violent Poiſon is mitigated into a vomit or purge: nay, it may eaſily happen, (epecially in robuſt conſtitutions, and if the bowels be at the ſame time by any means defended againſt the ſtimulating power of the medicine) that this twitching may be ſo ſlight, as to be almoſt inſenſible, and hardly troubleſome. And then the mercurial globules, being freed indeed from moſt of the ſaline parts in their paſſage thro' the primæ viæ, but ſtill having a mixture of ſome few of them, are quickly conveyed into the blood: where, by their motion and weight, they muſt neceſſarily diſſolve the preternatural coheſions of all the liquors, particularly of thoſe, which circulate in the ſmalleſt canals, and are moſt viſcid and tenacious, making them more fluxii and thin, or of more eaſy ſecretion. Whereupon all the glands of the body are, as it were, ſet to work, and ſcoured of their contents: but the ſalival ones eſpecially, being many in number, very large and wide, and the juice they ſeparate of a tough and ropy ſubſtance, ſo that a conſiderable quantity of it is accumulated, before it is forced out at the orifices of the ducts; theſe effects will be moſt remarkable in them, and a ſalivation or ſpitting muſt continue ſo long, till the active mineral particles are, through theſe and the other paſſages, diſcharged out of the body.

As the difference between Mercury corroſive and dulcified lies in a greater and leſſer degree of operation and force, ſo this ſame conſideration diſtinguiſhes the ſeveral preparations of this mineral from each other; which though very many, yet do all vary their effects in the body, only according as the mercurial globules are differently combined with ſalts, and the points of theſe more or leſs broken by the action of the fire, in the burning of ſpirits upon them, and ſuch like managements: and therefore however dignified with the great names of Arcana, Panaceæ, Prince's Powders, &c. they do not afford us any thing ſingular and extraordinary, beyond what we may with equal advantage promiſe ourſelves from ſome or other of the moſt common and uſual proceſſes.

We may alſo fairly conclude from this reaſoning, that the ſafeſt way of raiſing a ſalivation is by internal medicines; ſince whatever miſchiefs can be apprehended from theſe, may in a greater degree follow from the external uſe of Mercury: not only becauſe, as we have already hinted, the mineral globules, being intimately combined with ſalts in the ſeveral preparations given inwardly, will, by the irritation of theſe, be eaſily and fully thrown out at the organs of ſecretions, till the blood is quite diſcharged of its load; whereas in all the daubings with mercurial ointments, we can never be certain, that none of the heavy particles are left lodged in the interſtices of the fibres, or cells of the bones; but alſo, in as much as by computing the portion of Mercury in all the doſes neceſſary to promote a ſpitting, and the weight of the ſame mineral uſually applied when this is done by unction, it will appear that the quantity in the latter caſe vaſtly exceeds that in the former, and conſequently that the inconveniences to be feared will be in the ſame proportion.

Therefore this external management of quick-ſilver is chiefly to be recommended, where the conſtitution is not broken, or ulcers and tumours require a particular cure, by liniments, &c. and a more thorough cleanſing of the body. And even in ſuch caſes, it will certainly be beſt to annoint daily with ſmall quantities, and not to raiſe a high ſpitting; but promote the other ſecretions, particularly ſweating and urine, by plentiful drinking of thin liquors ; and alſo, if there be occaſion, by laxative medicines : for it is well known, that cures are often wrought by theſe means, although the mouth has never been ulcerated by the Mercury. At leaſt this method will be a remedy for a time, and enable the patient to recover ſtrength ; ſo that he may afterward, if it be neceſſary, undergo a more ſevere treatment.

It may be obſerved, that as the earlieſt uſe of Mercury was in unguents and emplaſters, ſo moſt of the prejudices and outcries againſt it are owing to effects produced this way. For the firſt attempts of the cure of venereal maladies by this remedy were learned from the Arabians [k], who, having recommended mercurial ointments in the lepra or ſcabies, gave a handle to the Italian phyſicians to try their efficacy, in removing the foulneſs of the ſkin from a new and terrible contagion : neither were they ſparing of their liniments, which they continued to rub in for twelve, fifteen, nay ſometimes for above thirty days together [l]. So that it is no wonder, if they often met with very untoward ſymptoms from ſo ſevere a treatment ; and if (as ſome of them [m] affirm) they now and then found Mercury in the rotten bones of their patients, who had, it may be, ſuffered too much both from their diſeaſe and their phyſician.

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[k] Vid. Joan. Baptiſt. Montan, tract. De morb. Gallic. inter autor. De morb. Gall. p. 482. & Fallop. De morb. Gall. cap. lxxvi.

[l] Nicol. Maſſa De morb. Gall. tract. iv. cap. 2.

[m] Argentum vivum accepi ex oſſe cujuſdam corrupto, quem perunctum ob empyricis plus decies ferebant, non ſemel emanaviſſe. Anton. Gall. in lib. De ligno ſancto non permiſcendo.

Non ſemel in ſepulchris argentum vivum in mortuorum capitibus reperi. Anton. Muſa Braſavolus in tract. De morb. Gall.

There are many hiſtories of this kind; neither are inſtances wanting in living perſons of Mercury running out of the body, from a tumour, either ſuppurated, or opened by a cauſtic: nay there is a caſe upon record, in which, upon opening a vein, ſome drachms of it flowed out with the blood [n].

To this examination of the properties and effects of Mercury, I ſhall add an inquiry into the nature of another mineral Poiſon, not very unlike it, either in its make or action: this is Arſenic.

There is ſome confuſion in the accounts, which authors give of this mineral. This ariſes from their not diſtinguiſhing the Arſenic of the ancients from what is now ſo called. I ſhall therefore exactly deſcribe both the one and the other, not only from the lateſt writers of natural hiſtory, (for what Agricola, Matthiolus, Schroder, and even Wepfer, the beſt authors extant when this book was firſt publiſhed, have delivered to us on this ſubject, is all wrong) but more particularly from ſome experiments communicated to me by the learned Dr. Hampe, a moſt excellent chemiſt, phyſician to her royal highneſs the princeſs of Wales.

The Arſenic of the Greeks, Ἀρσενικὸν or Ἀῤῥενικὸν, was what the Latins named Auripigmentum, we Orpiment.

This is found in Greece and Hungary, in particular mines and veins, and is never mixt with any other mineral. It is of a foliaceous or laminated texture, and contains a great deal of ſulphur: as appears by its inflammability, and by its giving, when mixt with mercury ſublimate, a true cinnabar. By ſimple fuſion it runs into a maſs of cinnabarine colour, called ſandaracha. Though it yields a regulus, in every reſpect like to the regulus of true Arſenic, yet it does not act as a ſtrong Poiſon. Hoffman [o] gave a good quantity of it to a dog, without any harm. The reaſon of this is, becauſe its metallic particles are combined with ſulphur, and not with ſalt, at leaſt in any conſiderable degree.

Such a compoſition makes this ſubſtance more uſeful in painting than in phyſic; and, together with its colour, has induced thoſe chemiſts, who have fancied that metals may be tranſmuted, to take it for the ſubject matter of their great work: for ſo they call the making of gold. They have very fondly grounded their hopes upon ſome odd ænigmatical verſes in the Sibylline Oracles[p]. But though ſome learned men have attempted to explain this riddle, as deſcriptive of the Grek name Ἀρσενικὸν; ye none have ſo far ſucceeded, as fully to reconcile the numbers therein expreſſed at length, with thoſe contained in the letters, of which that word conſiſts[q]. However, be that as it will, true it is, that this great expectation from this mineral is as old at leaſt as the time of Caligula, that is, of a more ancient date conſiderably, than the far greateſt part of theſe ſuppoſititious and ill-contrived compoſitions, which bear the ſacred name of oracles: for that covetous emperor, as Pliny relates[r], ordered a great quantity of orpiment to be melted and managed, that he might extract gold out of it; and made ſome, but (as it uſually happens in ſuch experiments) the profit did not anſwer the expence.

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[n] Vid. Ephemerid. Germanic. Dec. 3. ann. 5. Obſerv. 172.

[o] Obſerv. Phyſico-chym. lib. iii. Obſ. 1.

What we now call Arſenic is of three ſorts, white, yellow, and red. All theſe are factitious, and very probably not known to the ancients. They are made in this manner.

At Schneebergh in Miſnia there is found, in great quantities, a particular kind of mineral called cobalt, of a greyiſh colour, and ponderous. This roaſted and calcined, in a furnace made for that purpoſe, yields a white ſmoak, which gathers, at the end of a very long funnel, into an aſh-coloured powder, as fine as flour. This, with the addition of a true proportion of pot-aſh, is ſublimed, and gives the white cryſtalline Arſenic[s].

The metallic earth, of a vitreous nature, which remains after this operation, melted with a due proportion of calcined flints and pot-aſh, makes what is called ſmalt. The cobalt contains about three parts of Arſenic, and one of this earth.

When newly ſublimed and perfectly pure, it is a ſhining white tranſparent body, not unlike to a metallic glaſs: in the air it changes its bright whiteneſs to a milky colour, and becomes entirely opake. It is not inflammable; but evaporates in the fire, without leaving any earth behind, in a white ſmoak, ſmelling like garlick. It affords a ſemimetallic regulus, both by ſublimation and precipitation. The firſt is foliaceous, light and ſpongy; the other ponderous, though alſo of a foliaceous texture, and reſembles biſmuth. This laſt regulus may be made without iron, with the black flux only; or with nitre and tartar, in the ſame manner as is the regulus of antimony; but it requires a nice operator.

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[p] Ἐννέα γράμματ᾽ ἔχω, τετρασύλλαβός εἰμι, νόει με.
Αἱ τρεῖς αἱ πρῶται δύο γράμματ᾽ ἔχȣσιν ἑκάστη,
Ἡ λοιπὴ δὲ τὰ λοιπὰ, ϗ εἰσὶν ἄφωνα τὰ πέντε.
Τȣ̀ παντὸς δ᾽ ἀριθμȣ̃ ἑκατοντάδες εἰσὶ δὶς ὀκτὼ,
Καὶ τρεῖς τρὶς δεκάδες, ϗ δὶς τρία. Lib. i.

[q] Vid. Fabric. Bibl. Græc. V. xii. pag. 696.

[r] Nat. Hiſt. lib. xxxiii. c. 4.

[s] See Kunckel's Annotations upon Neri's Art of Glaſs, in German; and Philoſophical Tranſact. No. 293.

White Arſenic is entirely ſoluble in water. If one part of it be ſufficiently boiled in fifteen parts of diſtilled or rain-water, it gives by evaporation ſalts of triangular planes, which unite into octœdral cryſtals: and in theſe, either beat to powder, or diſſolved by boiling, metallic globules, reſembling thoſe of quick-ſilver, are plainly diſcovered by the microſcope. Which confirms what Kunckel ſays, that a great part of Arſenic is mercury [t]: ſo that Arſenic may be defined to be a volatile metallic ſalt.

Yellow Arſenic is prepared by ſubliming white Arſenic with the addition of a tenth part of ſulphur. This is not ſo tranſparent as the white, but ſplendid, and very like to a metallic yellow glaſs.

The red differs from the yellow only in this, that a greater quantity of ſulphur is added, together with a particular kind of a red cobalt called kupfer nickel.

This being the compoſition of this mineral, we may readily underſtand the manner of its deadly operation. The caſe is plainly the ſame with that of ſublimate corroſive: and as there the ſalts combined with the mercurial globules form cutting cryſtals; ſo here the metallic particles, which make the regulus, give a force and ſolidity to the ſaline bodies, which wound the ſtomach and guts, as the others do, even to ſuch a degree as to cauſe mortifications.

The ſeveral hiſtories related by Wepfer [u] put this out of queſtion: it is ſufficient to our purpoſe to mention one.

A dog having eat ſome fat mixed with white Arſenic, died the next day. The upper part of the ſtomach, when opened, was red and inflamed; the coats thinner than ordinary; the bottom of it was covered with a fetid ſlime, and ſome pieces of fat, the thin guts were ſo corroded, as to be pervious in three places, two of the ulcers ſo large that they would eaſily admit a bean: the cavity of the abdomen contained a yellowiſh ichor tinged with blood.

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[t] Chemical philoſophy confirmed by experiments, chap. xi. in Pyrotechnical Diſcourſes. Lond. 1705. 8vo.

[u] Cicut. aquat. hiſt. p. 274. & ſeq.

The caſe being thus, one would wonder, what ſhould induce authors to preſcribe ſo corroſive a mineral to be worn upon the pit of the ſtomach, as an amulet againſt the plague. This trick we may well believe to be dangerous, when Lionardo di Capoa [x] tells us of a child killed by the violent vomiting and purging, occaſioned from a ſlight wound made in the head by a comb wet with oil, in which Arſenic had been infuſed: for the pores of the body being opened by heat and exerciſe, ſome of the noxious effluvia might eaſily inſinuate themſelves into the part. Accordingly Crato [y] obſerved an ulcer of the breaſt cauſed by this application; Verzaſcha [z] violent pains, and fainting fits; Diemerbroeck [a], and Dr. Hodges [b], death itſelf.

The truth of the matter is, this practice ſeems to owe its origin to a miſtake. Perhaps ſome of the Arabian phyſicians had commended darſini worn in a bag for a preſervative in plague time. This in their language ſignifies cinnamon: but the Latin interpreters retaining the ſame word in their tranſlations, (as was frequently done) one or other afterward not underſtanding its meaning, and deceived by the likeneſs of the ſound, ſubſtituted in its place de arſenico, as if darſini were all one with zarnich. The authority of the firſt author ſerved to propagate the error: nor were thoſe wanting, who reaſoned upon the matter, and found it agreeable to their philoſophy, that this mineral ſhould draw to itſelf and concenter the arſenical effluvia out of the air, and thus ſecure the body from their infection; theſe being, as they imagined, the common cauſe of peſtilential diſeaſes.

Having thus particularly diſcourſed of the nature of theſe two Poiſons, I ſhall not need to inſiſt upon any more out of the mineral kingdom.

All of them bear ſome analogy to the former, and are more or leſs dangerous, according as their ſalts receive a differing force from the metallic particles. For this reaſon, as we have obſerved, that the moſt virulent may be mitigated by breaking the points of the ſaline cryſtals; ſo on the other hand, the moſt innocent minerals may become corroſive, by combining them with ſalts: as we ſee in the ſeveral preparations of ſilver, antimony, iron, &c.

This put me in mind of making a remark, which I think both curious and uſeful. It is obſerved, that the fumes of lead are very noxious to thoſe, who are conſtantly employed in melting it, as plumbers, caſters of ſhot, &c. A learned phyſician, of my acquaintance, lately told me, that a great artiſt in this way had aſſured him, he had found by experience, that this inconvenience did not attend the melting new lead, in any degree ſo much as it did the melting it when it was old: that he had workmen, who had for many years laboured under him, in caſting new metal, and had never ſuffered in their health by it. This difference he rightly aſcribed to the corroſive quality, which lead acquires from the ſalts in the air, by lying long expoſed to it.

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[x] Incertezza de' medicamenti, pag, 82.

[y] Epiſtol. 168.

[z] Obſerv. 66.

[a] De peſte, Hiſtor. 99. Annotat.

[b] De peſte, Lond. pag. 239.

For the fumes of minerals are only parts of the reſpective ſubſtances minutely divided; and therefore will not only produce ſuitable effects, but alſo in a more dangerous way; being not ſo much guarded againſt, and yet admitted farther into the body, that is, into the lungs, in reſpiration, as well as into the ſtomach, by means of the ſaliva: not to mention the impreſſion upon the ſpirits in the noſtrils, which muſt certainly be very conſiderable.

I had once in my poſſeſſion, given me by an ingenious chymiſt, a clear liquor, which though ponderous, was ſo volatile, that it would all fly away in the open air, without being heated; and ſo corroſive, that a glaſs ſtopple of the bottle, which contained it, was in a ſhort time ſo eroded, that it could never be taken out. The fume from it was ſo thin, that if a candle was ſet at ſome diſtance from the bottle, upon a table, the heat would direct its courſe that way; ſo that it might be poiſonous to any one that ſat near to the light, and to no body beſides. I know the compoſition of this ſtygian ſpirit; but it is better, that the world ſhould not be inſtructed in ſuch arts of death. It is ſufficient to our purpoſe to obſerve, that it was ſalts combined with metallic bodies.

OF POISONOUS PLANTS.

FROM Minerals we come to poiſonous Plants. The moſt noted of theſe are the Cicuta and Aconitum. The former is of two ſorts, our common Hemlock; and the Aquatica, which Mr. Ray calls Cicutaria paluſtris tenuifolia.

What the Cicuta, ſo much in uſe of old for killing, eſpecially at Athens, was, we don't know: it is moſt probable, that it was not a ſimple but compounded thing. The hiſtory of the noble death of Socrates, related by his diſciple Plato [a], (if this is not wrought up with more of ornament than truth) ſeems to evince it to have been a mixture of ſome anodyne juices with others of a corroſive nature. Theophraſtus [b] ſays, that Thraſyas, a great phyſician, had invented a compoſition, which would cauſe death without any pain; and that this was prepared with the juice of hemlock and poppy together, and did the buſineſs in a ſmall doſe.

An extract of this kind might perhaps take away life with ſuch ſymptoms, as this great philoſopher went off with, viz. eyes fixt, heavineſs and inſenſibility in the legs, then great coldneſs in them, which by degrees ſeized the vital parts.

I am the more inclined to believe this, from what is recorded anciently of the people of Marſeilles, that they had a poiſon kept by the public, in which Cicuta was only an ingredient; a doſe of which was allowed by the magiſtrates to any one, who could ſhew a reaſon why he ſhould deſire death. For, this cuſtom, as Valerius Maximus obſerves [c], came from Greece, particularly from the iſland Ceos, where he ſaw an example of it in a woman of great quality, who, having lived very happy ninety years, obtained leave to die this way, leſt by living longer ſhe ſhould happen to ſee a change of her good fortune.

But the Cicuta Aquatica, at leaſt in our colder countries, is much more violent than the other. Wepfer has, in a very learned treatiſe, deſcribed its deadly effects in ſome children, who by miſtake had eat of the roots of it. Theſe were exceſſive pain and heat in the ſtomach; terrible convulſions, with the loſs of the ſenſes: diſtortion of the eyes; flowing of blood out at the ears; the jaws ſo hard ſhut that no force could open them; efforts to vomit, but nothing thrown up; frequent hickups; with a great diſtenſion and ſwelling, eſpecially at the pit of the ſtomach; and when death had concluded the tragedy, a continued running of green froth at the mouth.

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[a] Phædon. ſub. finem.
[b] Hiſt. Plant. lib. ix. c. 17.
[c] Lib. ii. c. 6. §. 8. Vid. Ælian. Var. Hiſt. lib. iii. c. 37.

Stalpart vander Wiel gives the like account of two perſons killed at the Hague by the ſame roots [d].

In a dog, that, for experiment's ſake, died by this poiſon, the ſtomach when opened, was found quite conſtringed, and ſhut up at both orifices; its inward ſurface red, with livid ſpots here and there.

Thus it appears, that this plant conſiſts of hot, acrid and corroſive parts; which by rarefying the natural juices of the ſtomach, and hurting its nerves, are the cauſe of thoſe terrible diſorders, which have been deſcribed.

For, upon the ſenſe of a violent irritation and pain, the nervous fluid is by the mind, in a kind of ſurpriſe and hurry, determined in great quantities to the affected part; in order to throw off the cauſe of the diſagreeable ſenſation: which, if the ſtimulus be not over great, is done by the contraction of the fibres of the ſtomach, and muſcles of the abdomen, cauſing vomiting. But when the painful twitching is quite intolerable, the buſineſs is over-done; and the fibres are drawn into ſpaſms, which contract the mouth of the ſtomach, ſo that the noxious matter cannot be diſcharged, but is kept there in continued force and action. And by the communication of the infection through the nervous ſyſtem, the whole body quickly ſuffers; the blood-veſſels are torn and broken by the violence of the convulſions, and blood guſhes out from the ears, noſtrils, &c.

This univerſal muſcular contraction was the reaſon, that one of the children, attended by Wepfer, made urine in the midſt of the agony, to the heighth of five or ſix feet, with a ſtrength and violence ſurpriſing to the ſpectators.

The caſe of the Aconitum is much the ſame. This is our napellus or monks-hood; and its effects do ſo nearly agree with thoſe now related of the Cicuta, that I ſhall not need to recite them: the experiments of Wepſer [e] are full and convincing. And indeed, as all the hiſtories, which this ſame author has ſo carefully given us, of trials made with ſeveral vegetable poiſons, as the Solanum, Nux Vomica, Cocculus Indicus, &c. on different creatures, put it out of all doubt, that the common miſchief of theſe is a twitching and ſlight inflammation of the ſtomach, with an affection of the nervous fluid; ſo it appears from hence, that virulent plants, although they may be diſtinguiſhed even from one another by particular virtues, do however kill by a like operation and force, which differs chiefly in degree from that of noxious minerals.

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[d] Obſervat. Cent. 1. Obſ. 43.

[e] Pag. 176, ſeq.

Nor is it at all ſtrange, that the ſymptoms from a vegetable, and from a mineral virulency, ſhould be ſo different, although of the ſame kind, and only of unequal force: for the more ſolid parts of minerals, eroding the coats of the ſtomach, induce a perfect mortification and gangrene, and thus do their work at once; whereas the weaker ſalts of plants can make only pungent irritations, upon the painful ſenſe of which the animal is thrown into convulſions, and dies by theſe prevailing in all parts of the body.

Upon this ſcore, though mineral poiſons do not commonly paſs the primæ viæ, vegetable ones in ſome caſes may: juſt as we find that thoſe medicines, which have a great degree of irritation, preſently induce a vomiting; whereas the ſame twitching a little weakened, ſuffers them to paſs into the inteſtines, and work downward by ſtools.

By this we may perhaps, give ſome gueſs at the nature of thoſe poiſons, with which they tell us the natives in ſome parts of Africa and India are ſo expert at killing, that they can do it in a longer or ſhorter time. Theſe are moſt probably either the fruits, or the inſpiſſated juices of corroſive plants, which inflaming the bowels, may cauſe little ulcers there, whoſe fatal conſequences, we know, may very well be ſlow and lingering.

This I am the rather induced to believe, becauſe an ingenious ſurgeon, who lived in Guinea, told me, that the antidote, by which the negroes would ſometimes cure thoſe who were poiſoned, was the leaf of an herb, which purged both upward and downward. For by this means the ſtomach might be cleared from the adhering corroſive parts of the venom. Yet I can hardly think it poſſible at the ſame time, that they ſhould be able, by varying the compoſition or quantity of the doſe, to aſcertain the time in which it ſhall kill, to a week, month, &c. nor have I ever met with any perſon, who could atteſt this to be matter of fact: though repeated trials and obſervations may help one well practiſed in ſuch tricks, to give notable conjectures in this point.

The ancients indeed pretended much the ſame thing with their Aconitum, of which they ſeem to have a kind of ſecret and myſtery: as we learn from Theophraſtus [f], who ſays, "the ordering of this poiſon was different, according as "it was deſigned to kill in two, three months, or a year." But this he relates only as a common tale or opinion, and not as a ſtory, to which himſelf gave any manner of credit.

It is very plain, that the common cure of all poiſons, taken into the ſtomach, muſt be by throwing them up again by vomiting as ſoon as poſſible, and defending the membranes from their pungent acrimony. Drinking very large quantities of warm milk, with oil of ſweet almonds, till the vomiting ceaſes, will anſwer the firſt intention: the other, in mineral poiſons, (for the effects of the vegetable, after they have been vomited up, generally go off, by diluting plentifully with ſoft and fat liquids) requires particular care, which, I think, may be in this way. We have found the force of theſe to depend upon a combination of metallic particles with ſaline cryſtals: therefore the diſuniting of theſe muſt deſtroy their power. This (as Kunckel [g] has hinted) may be done, by drinking a quantity of a lixivium, made by a ſolution of ſalt of tartar in water: for this ſalt, uniting with the corroſive cryſtalline ſalt, will, (after ſome degree of effervescence) kill it, as the chemiſts ſpeak; by which means, being diſengaged from the mineral globules, it will be rendered of no effect.

This practice is founded upon a remarkable experiment, related by the ſame author, which is this. A child's head, for the cure of ſcabs, was daubed over with an ointment made of ung. pomat. and ſublimate corroſive: this immediately cauſed ſuch a ſwelling, with intenſe pain and inflammation, that the eyes and noſe could not be ſeen. In this extremity, when the patient was thought to be dying, a learned chemiſt, happily coming to the houſe, adviſed to foment the head all over with a ſtrong lixivium: this, in a few hours, quite removed the terrible ſymptoms.

What ſuch an application could do outwardly, it may, upon the ſame rational grounds, be preſumed it will perform likewiſe in the ſtomach, at leaſt in ſome degree; and thus become an antidote againſt the moſt violent of all known poiſons.

[f] Hiſt. Plant. lib. ix. c. 16.

[g] Chemical philoſophy confirmed by experiments.

ESSAY

ESSAY V.

OF OPIUM.

THE ancients having experienced, that Opium would oftentimes kill, though taken in no large quantity, ranked it with poiſons, and gave it the firſt place among thoſe, which from their ſtupefying quality they called narcotic.

True indeed it is, that we do every day find this to be, in a ſmall doſe, one of the moſt noble remedies in the world. But it is not worth the while to engage in the controverſy, how far poiſons are medicinal: ſince it is notorious enough, that medicines ſometimes prove poiſonous. And take the matter as we pleaſe, it may ſerve to very good purpoſes to underſtand the manner of operation of ſo celebrated a drug, and help us in a great meaſure to aſcertain its uſe in different caſes, if we are before-hand rightly apprized of its nature and way of acting.

In order hereunto, it is neceſſary, beſides ſome other præcognita, ſince one of the chief virtues of this medicine is hypnotic, to define diſtinctly what ſleep is, or rather, (to avoid confuſion and diſputes about words) what difference there is between an animal body, when aſleep and when awake: for I ſuppoſe the hiſtory, manner of preparing, &c. of Opium, to be already known.

Firſt then, there is no one but knows, that in ſleep there is a ceſſation from action. When waking, we walk, diſcourſe, move this or that limb, &c. but in natural and undiſturbed reſt there is nothing of all theſe: that is, whereas, being awake, we perform ſeveral motions by the voluntary contraction of our muſcles; when aſleep, thoſe muſcles only are contracted, whoſe action is in a manner involuntarily, or to which the mind has always ſo conſtantly determined the ſpirits, that it does it by a habit, without the intervention of the reaſoning faculty: ſuch are thoſe of the heart and breaſt.

So that there is at this time a kind of relaxation or looſeneſs of the moving fibres of the ſeveral members; or at leaſt ſuch a quiet poſition and ſtate of them, by which all the antagoniſt muſcles are in an æquilibrium and equality of action, not over-powering one another. For this indeed ſeems to be one great deſign of ſleep, to recover to the parts over-ſtretched by labour their former tone and force: and therefore we naturally, when compoſing ourſelves to reſt, put our body into that poſture, which does moſt favour the particularly wearied limbs, and conduce to this end.

In the next place, it is very plain, that there is in ſleep not only a reſt, and ſuſpenſion from acting, of moſt of our bodily organs, but even of our thinking faculty too; that is, (for I would prevent cavils) a ceaſing from ſuch thoughts, as when waking we are exerciſed about, which we reflect upon, and will to employ our mind with. For though dreams are thoughts, yet they are but imperfect and incoherent ones, and are indeed either ſo faint and languid repreſentations, as to be conſiſtent with our ſleep, as ſome may be: or elſe if they be ſtrong and lively, they are, as every one knows, the interruption and diſturbance of it.

From hence it will follow, that the motion of the arterial fluid muſt be, cæteris paribus, more ſedate, even and regular, in the time of ſleeping than waking. For, beſides the various alterations, which in the latter ſtate this receives from the ſeveral paſſions of the mind, the very contractions of the muſcles themſelves in exerciſes of the body differently forward its courſe: whereas in ſleep the force of the heart and pectoral muſcles being more conſtant and uniform, gives it a more calm and equally continued impulſe.

Hence alſo it will come to paſs, that the influx of the liquor of the nerves into the organs of the body, as alſo its reflux towards the brain, is in ſleep either none, or very inconſiderable: that is, that this fluid has at this time but little or no motion. For it is muſcular action and ſenſation that require it to be thus determined this way or that, which are now hardly any. And yet by the arrival of blood at the brain, this juice will ſtill be ſeparated there, fit to be derived into its canals or tubes: ſo that by this means there will be a kind of accumulation, or laying up in ſtore, of ſpirits for the offices and requirements of waking.

Thus we may in ſhort look upon the time of watching, as the time of wearing out, or the deſtruction of the animal fabric; and the time of ſleep, as that in which it is repaired and recruited: not only upon the account of what we have juſt mentioned concerning the nervous liquor, but alſo with reſpect to all the other parts, as well fluid as ſolid. For action does neceſſarily by degrees impair the ſprings and organs; and in motion ſomething is continually abraded and ſtruck off from the diſtractile fibres, which cannot otherwiſe be reſtored than by their being at reſt from tenſion. Beſides that, ſuch a regular and ſteady courſe of the blood, as we have obſerved to be in ſleep, is by far more fit and proper for nutrition, or an appoſition of parts to the veſſels, which an uneven hurry of it is more apt to tear off and waſh away.

The caſe being thus, it is very plain, that whatſoever can induce ſuch a diſpoſition of the fluids and muſcular parts of the body, as this we have deſcribed, will ſo far cauſe ſleepineſs. And in like manner, when any thing interpoſes and hinders this compoſedneſs and tranquillity, the removing of the impediment will be the cauſing of ſleep: inaſmuch as this is only reducing the animal œconomy to its right ſtate, in which by natural order there muſt be a ſucceſſion of ſleeping and waking.

Thus it appears how neceſſarily continued exerciſes make us ſleepy, ſince theſe exhauſt the juice of the nerves; that is, both leſſen its influx into the organs of motion, and incline the mind not to determine it any longer that way, upon the account of the pain and uneaſineſs, with which too violent a tenſion of the parts is always attended: which therefore we muſt needs deſire to relax, or lay to reſt.

That ſleepineſs, which follows upon a fulneſs of the ſtomach after eating or drinking, is owing to a different cauſe; and does indeed ſo nearly fall in with the effects of opiate medicines, that it requires a particular conſideration.

As hunger, or the emptineſs of the ſtomach, is a painful ſenſation; ſo the ſatisfying, or removing of this, is a pleaſing or agreeable one. Now all pain is a ſtimulus upon the part affected; and this, we all know, being attended with contractions of the pained membranes, cauſes a greater afflux than ordinary of the nervous juice that way. On the other hand, pleaſure, or a delightful ſenſation in any part, is accompanied with a ſmooth undulation, and eaſy reflux of the liquor of the nerves towards the brain. This is, as it were, the entertainment of the mind, with which being taken up, it does not determine the ſpirits to the organs of motion: that is, there is ſuch a relaxation of the muſcular fibres, and ſuch a diſpoſition of the nervous fluid, as we have obſerved to be neceſſary to ſleep.

This is the reaſon of that chillineſs in the limbs, which we commonly complain of after a good feaſt.

If it ſeem ſtrange, that a pleaſure in the ſtomach ſhould ſo powerfully influence the mind; let it be conſidered, on the other hand, how violent effects an uneaſy and diſagreeable ſenſe in the ſame part does produce; what a terrible agony two or three grains of crocus metallorum throws the whole fabric into; how readily the fluid of the nerves is with a more than ordinary impetus determined and commanded into the muſcles of the ſtomach and abdomen, in order to throw off the enemy, and remove the ungrateful ſenſation.

Now the conſequences, which we have aſcribed to a pleaſing ſenſe in this part, are only juſt the contrary of theſe, we find the oppoſite affection of pain induces. And indeed pleaſure and pain are two great ſprings of action in the animal œconomy; the changes they make in the fabric are the cauſes of many effects which ſeem ſurpriſing, becauſe we do not regard the mechaniſm, by which they are produced: but theſe muſt be more conſiderable in the ſtomach than any where elſe; this part being, for very wiſe purpoſes, of ſo acute a feeling, that ſome philoſophers have for this reaſon thought it to be the ſeat of the ſoul.

Beſides this conſideration, we muſt take notice, that the ſtomach, being diſtended with food, preſſes upon the deſcending trunk of the aorta, and thus cauſes a greater fulneſs of the veſſels in the upper parts: whereupon the brain is loaded, or the derivation of ſpirits into the nerves diminiſhed, and inactivity or drowſineſs enſues. From hence proceed thoſe fluſhings in the face, redneſs, &c after plentiful eating or drinking, moſt viſible in thoſe, whoſe veſſels are lax and weak: as in exhauſted and hectic perſons they more eſpecially are.

Thus we may, without the aſſiſtance of the new chyle entering into the veſſels, account for that inclination to ſleep, which follows upon a full ſtomach; though we muſt alſo allow the diſtenſion from this to be a conſiderable cauſe of the ſame effect. But this does not happen immediately, nay, ſometimes perhaps not within two or three hours after eating: and therefore the ſudden drowſineſs muſt (as well as the preſent refreſhment and reviving, which meat gives) be chiefly owing to ſome more ſpeedy alteration.

We come then in the next place to Opium itſelf: the chemical analyſis of which, out of ſix ounces, afforded, of a volatile alcaline ſpirit, not very unlike to that drawn from hartshorn, two ounces; of fetid oil, five drachms, one ſcruple, ſixteen grains; of coal, void of ſalt, two ounces, two drachms, one ſcruple, four grains.

The virtues therefore of Opium are owing to a volatile alcaline ſalt, intimately mixt and combined with an oily, ſulphureous ſubſtance; the effects of which we muſt conſider, firſt of all upon the ſtomach, and afterwards, when they have paſſed the primæ viæ, upon the arterial fluid itſelf.

An agreeable ſenſation produced in the ſtomach, together with a diſtenſion of its membranes, we obſerved before to be the cauſe of that ſleepineſs, to which we are ſo prone after eating. The one of theſe engages the mind, the other acts upon the body. For pleaſure amuſes the ſoul, as it were, ſo that it does not think, or exerciſe itſelf about any outward objects: that is, is inclined to reſt. And the fulneſs of the veſſels in the brain checks and hinders, in ſome meaſure, the derivation of the nervous juice into the organs, &c.

Now they, who take a moderate doſe of Opium, eſpecially if not long accuſtomed to it, are commonly ſo tranſported with the pleaſing ſenſe it induces, that they are, as they oftentimes expreſs themſelves, in heaven: and though they do not always ſleep, (which proceeds from the preſentation of pleaſing images to the mind being ſo ſtrong, that like dreams they over-engage the fancy, and ſo interrupt the ſtate of reſt) yet they however enjoy ſo perfect an indolence and quiet, that no happineſs in the world can ſurpaſs the charms of this agreeable extaſy.

Thus we have from this medicine, but in a far more eminent degree, all thoſe effects, which we obſerved to follow upon that grateful ſenſe in the ſtomach, which a moderate fulneſs produces. For no bodies are ſo fit and able pleaſingly to affect our ſenſible membranes, as thoſe which conſiſt of volatile parts, whoſe activity is tempered and allayed by the ſmoothneſs of ſome lubricating and oily ones: which, by lightly rarefying the juices of the ſtomach, and cauſing a pleaſant titillation of its nervous coat, will induce an agreeable plenitude, and entertain the mind with ideas of ſatisfaction and delight.

The caſe being thus, we eaſily ſee upon what mechaniſm the other virtues of Opium depend, its eaſing pains, checking immoderate evacuations, &c not only in that the mind being taken up with a pleaſing ſenſe, is diverted from a diſagreeable one; but all pain being attended with a contraction of the part, that relaxation of the fibres, which it now cauſes, eludes and deſtroys the force of the ſtimulus.

In like manner, in immoderate ſecretions there is moſt commonly an irritation of the organs, the removal of which will abate the diſcharge. And herein lies the incraſſating quality of this medicine, in that the twitching ſenſe upon the membranes of the lungs, bowels, &c. being now leſſened, the ſharp humour is ſuffered to lodge there in a greater quantity, before it is ſo troubleſome as to be thrown off and expelled: it being all one as if there were no irritation of the part, if the uneaſy ſenſe thereof be not regarded by the mind.

Theſe effects will all be heightened by the mixture of the opiate particles with the blood; which is hereupon rarefied, and diſtends its veſſels, eſpecially thoſe of the brain: and this does ſtill to a greater degree leſſen the influx of the nervous fluid to the parts, by preſſing upon the little tubuli, or canals, through which it is derived.

This is the reaſon of that difficulty of breathing, which they for a time experience, who take this kind of medicine: this ſymptom being inſeparable from the rarefaction of the blood in the lungs.

From hence it appears, that the action of Opium is very analogous to that of other volatile ſpirits, only that a ſmall portion of it has a force equal to that of a greater quantity of moſt of them.

This is very evident in thoſe, who accuſtom themſelves to take large doſes of it; as the Turks and Perſians do to that degree, that it is no uncommon thing there to eat a drachm or two at a time; for the effects of it in them are no other than downright drunkenneſs; upon which account [a] it is as common a ſaying with them, and on the ſame occaſion, "he has "eat Opium;" as with us, "he has drank too much "wine."

Neither indeed do they otherwiſe bear ſuch large quantities of it, than our tiplers will a great deal of brandy: that is, by habituating themſelves to it by degrees, beginning with ſmall doſes, and requiring ſtill more and more to raiſe themſelves to the ſame pitch. Juſt as Galen [b] tells us of a woman at Athens, who by a gradual uſe had brought herſelf to take, without any hurt, a conſiderable quantity of Cicuta, or hemlock. Which inſtance is the more to our purpoſe, becauſe Nic. Fontanus [c] knew one, who being recovered of the plague, and wanting ſleep, did, with very good effect, eat hemlock for ſome time: till falling ill again of a fever, and having left off the uſe of this remedy, he endeavoured to procure reſt by repeated doſes of Opium, (which nature having been accuſtomed to a ſtronger alterative) had no operation, till the help of Cicuta was again called in with deſired ſucceſs.

It is a ſufficient confirmation of all this reaſoning, that Proſper Alpinus [d] obſerved among the Egyptians, thoſe who had been accuſtomed to Opium, and were faint and languid through want of it, (as drinkers are if they have not their liquor) to be recovered, and put into the ſame ſtate of indolence and pleaſure, by large doſes of Cretic wine made hotter by the infuſion of pepper, and the like ſtrong aromatics.

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[a] Vid. Belon. Voyag. lib. iii. c. 15. [b] Simpl. Medicam. Facult. lib. iii. c. 18. [c] Reſponſ. & Curat. Medic. p. 162. [d] Medicin. Ægypt. lib. iv. c. 1.

Nor is it perhaps amiſs to remark, than in maniacal people, as is frequently obſerved, a quadruple doſe of Opium will ſcarce produce any conſiderable effect. Now in perſons ſo affected, the mind is deeply engaged, and taken up with ſome images, or other, as love, anger, &c. ſo that it is not to be ſo eaſily moved or diverted by thoſe pleaſing repreſentations, which it would attend to at another time, and upon which the virtues of this medicine in a great meaſure depend. Beſides this, thoſe who are maniacal do to a wonder bear the injuries of cold, hunger, &c. and have a prodigious degree of muſcular force; which argues the texture of their blood to be very ſtrong, and the coheſion of its globules great: ſo that the ſpirituous parts of the opiate, cannot make that disjunction and rarefaction of this fluid in them, which it does in ordinary bodies and conſtitutions.

Many are the improvements, which might be made of this theory, with relation to the practice of phyſic: but theſe will be obvious enough to one inſtructed in the animal œconomy.

I cannot, however, omit two uſeful remarks from it. The firſt is, that by not underſtanding the manner. in which this noble medicine acts, when it checks immoderate ſecretions, phyſicians are often led into wrong methods, and give it to ſtop thoſe evacuations, in which there are no ſpaſms or painful irritations; as particularly, in colliquative diarrhœa's attending hectic fevers: whereas, it is manifeſt, it muſt in ſuch caſes (without the deſired effect) do real miſchief, by relaxing the fibres, and heating and rarefying the fluids, already too thin and broken in their texture.

And, on the other hand, it is eaſily ſeen, that this ſame property, by which it takes off cramps in the nerves, and thus cures excretions depending upon them, will very often happily promote thoſe diſcharges which are natural, when they are unſeaſonably interrupted by violent contractions. Thus opiates, in nephritic pains, move the urine ſtopped by gravel and ſtones; and, in uterine caſes, aſſiſt nature in propelling the menſes, the fœtus and the lochia.

To conclude then, it is very plain, that there needs no more to make Opium prove deſtructive or a poiſon, than to take too great a quantity of it: for then it muſt inflame the ſtomach,

mach, and rarefy the blood to ſuch a degree, that the veſſels cannot again recover their tone; whereupon apoplectic ſymptoms, &c. will enſue.

To be convinced of this, I forced into the ſtomach of a ſmall dog about half a drachm of crude Opium diſſolved in boiling water. He quickly vomited it up with a great quantity of frothy ſpittle; but repeating the trial, by holding up his head, and beating him, I made him retain three or four doſes, intermitting between each about a quarter of an hour. When he had thus taken, as I could gueſs, near two drachms, I watched him about an hour: then he began to ſleep, but preſently ſtarted up with convulſions, fell into univerſal tremblings, his head conſtantly twitched and ſhaking, he breathed ſhort and with labour, loſt entirely the uſe firſt of his hinder legs, and then of the fore ones, which were ſtiff and rigid like ſticks. As he lay ſnorting, to haſten his end, I was giving him more of the ſolution; but on a ſudden his limbs grew limber, and he died.

Opening his ſtomach, I found it wonderfully diſtended, though empty of every thing but ſome water and Opium; parcels of frothy mucus ſwimming in it: the inſide was as clean as if ſcraped and waſhed from all the ſlime of the glands, with ſome redneſs here and there, as in a beginning inflammation. The pylorus was contracted. The blood-veſſels of the brain were very full: and I took out a large grume of concrete blood from the upper part of it, cutting into the ſinus longitudinalis, as is not uncommon in apoplectic carcaſes; but found no extravaſated ſerum in the ventricles, nor among any of the membranes.

As to the cure in ſuch caſes; beſides emptying by vomiting, bleeding and bliſtering, acid medicines and lixivial ſalts are the proper remedies. Theſe contract the relaxed fibres, and by their diuretic force make a depletion of the veſſels. I have particularly, with extraordinary ſucceſs, given repeated doſes of a mixture of ſalt of wormwood with juice of lemons. This is the foundation, upon which Van Helmont prepared his laudanum cydoniatum, and Starkey his pacific pill. Generous wine, which the antients gave for an antidote, can be no other ways uſeful, than as it diſſolves the reſinous clammy part of the ſtomach, and ſo forwards its expulſion by other helps, which cauſe a contraction of the muſcular fibres.

As an Appendix to this diſcourſe, I ſhall ſubjoin an account of another poiſon, very different from any we have deſcribed, but nearly related to thoſe called narcotic.

This is the ſimple water diſtilled from the leaves of the Lauroceraſus or common laurel: the bad effects of which were firſt obſerved ſome years ſince in Ireland; where, for the ſake of its flavour, it was frequently mixed with brandy.

A ſmall quantity of this killed two women, who drank it, very ſuddenly. Hereupon a learned phyſician, ſurprized at the event (this plant having never been thought to be any ways noxious) made ſeveral experiments with it upon dogs, which were afterwards, ſome of them, repeated here, with the ſame fatal ſucceſs [a].

From all theſe, but more particularly from obſervations communicated to me by Dr. Nicholls, (which he had made in his anatomical lectures) I ſhall give a ſhort deſcription of the appearances in the animals put to death in this uncommon way.

All the dogs fell immediately into totterings and convulſions of the limbs, which were preſently followed by a total paralyſis, ſo that no motion could be excited even by pricking or cutting them.

No inflammation, upon diſſection, was ſeen in any of the internal membranes. The moſt remarkable thing was, a great fulneſs and diſtenſion of the veins, in which the blood was ſo fluid, that even the lymph in its veſſels was generally found tinged with red.

The ſame water, injected, as a clyſter, into the inteſtines, had always the like effects, in a very few minutes.

To make the manner of acting of this poiſon more evident, Dr. Nicholls prepared a quantity of it much ſtronger than ordinary, by cohobating, (as the chemiſts call it) or diſtilling it twice from freſh leaves. By this proceeding he had about a drachm of a heavy oil, of the colour of olive oil, ſubſiding at the bottom of about three pints of water: this, by frequent ſhaking, was quite incorporated again with the water.

About two ounces of this killed a middle ſized dog, in leſs than half a minute, even while it was paſſing down the throat.

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[a] Vid. Philoſoph. Tranſact. No. 418 and 420.

I do not know a more convincing proof of what I have all along affirmed, that all poiſons act principally upon the nervous fluid, than this ſeemingly innocent water gives us. That a ſimple liquor, without any extraordinary ſenſible qualities, ſhould even in its paſſage into the ſtomach, nay when thrown into the lower guts as a clyſter, inſtantaneouſly kill, and that without any marks of inflammation or corroſion, can no other way be accounted for, but by an immediate effect upon the animal ſpirits.

If what I have, in the Introduction, conjectured concerning the nature of the nervous fluid, be right; the elaſtic matter, which enters into its compoſition, muſt in the membranes ſuffer a repulſion from ſome active particles in this water: (as we ſee in many experiments of electricity, it is in this manner affected by ſeveral bodies meeting with it) in conſequence of which, the nerves, firſt of the membranes which it touches, and then of all the organs, muſt loſe their action. Hence it is that animals killed this way, after ſtrong convulſions, die univerſally paralytic: and a ſudden ſtop being put to the circulation, the blood remains in perfect fluidity in the veins.

More will be ſaid to this purpoſe in the following Eſſay. I ſhall only add here, that the deadly power of this water ſeems to be intirely owing to its being over-ſaturated with that heavy oil, which we have mentioned: and therefore Dr. Nicholls experienced, that ten drops of a red oil, (like to this, of a kernelly flavour and taſte) diſtilled in the ſame manner from bitter almonds, (after the ſweet oil had been expreſſed) mixt with an ounce of common water, in like manner, killed a dog in about half an hour.

Conſidering all this, and that it would be a confirmation of what I have aſſerted, if the application of ſuch ſubſtances, as draw back the ſpirits to their membranes, ſhould, by an irritating force, contrary to the repelling liquor, revive the dying animal; we gave to a ſmall dog about an ounce of ſtrong laurel-water. He fell immediately into moſt violent convulſions, which were ſoon followed by a total loſs of his limbs. When he ſeemed to be expiring, we held to his noſtrils a phial of good ſpirit of ſal ammoniac, and forced a ſmall quantity o the ſame down his throat: he inſtantly felt its virtue, and, b continuing the uſe of it for ſome time, by degrees recovere the motion of his legs; and, in about two hours, walke about with tolerable ſtrength, and was afterwards perfectl well.

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The antidote ſhews the nature of the poiſon; and I make no doubt but the ſame will prove effectual againſt any others of this kind, which, without an inflaming quality, ſtupefy, and ſtop the motion of the nervous fluid.

I give this hint, becauſe it is well known, that the kernels of ſome fruits, particularly of black cherries, afford by diſtillation a water, in taſte and ſmell, not unlike to that from laurel or bitter almonds: which, if drawn off very ſtrong, or over-impregnated with the heavy oil, may certainly cauſe the like bad ſymptoms. Some trials, as I am informed, have proved this to be ſo. Upon this account, I think our ſhops had better be without this water; eſpecially ſince it is not known to have any medicinal virtue, and is commonly given to infants, eaſily affected, and ſubject to convulſions, the very diſorder, which waters of this kind have been found to produce.

ESSAY VI.

OF VENOMOUS EXHALATIONS from the EARTH, POISONOUS AIRS, and WATERS.

BESIDES theſe already treated of, there is yet another way of being poiſoned, and that is by venomous ſteams and exhalations, or a poiſonous air taken into the body by the breath.

This is notorious enough, and authors upon many occaſions make mention of it; but when they come to explain the particular manner how this kills, they moſt commonly reduce it to ſome of the poiſons, which prove deſtructive by being admitted into the ſtomach: alledging that malignant fumes and airs are therefore fatal, becauſe impregnated with arſenical, mercurial, and the like hurtful μιάσματα or particles, they convey theſe into the body; which being of a very corroſive nature, muſt neceſſarily do hurt both to the fluid and ſolid parts.

And indeed that the fumes of theſe ſame minerals are very pernicious, and are filled with their atoms very unfit for reſpiration, is moſt certain; but to argue from hence, that all deadly vapours and malignant airs owe their miſchief to theſe only, is too fond and ill-grounded a conceit: ſince upon a due inquiry it will appear, that there may be, and are, mortiferous exhalations from the earth, infecting the air, of a nature ſo different from any of thoſe poiſons; that the very ſubſtance, from which they ariſe, may not be at all hurtful, though taken into the ſtomach itſelf.

Venomous ſteams and damps from the earth the Latins, in one word called Mephites[a].

This, as many other Tuſcan words, comes from a Syriac theme, which ſignifies to blow or breathe[b]. And in ancient times ſeveral places were remarkable for them: ſo the Mephitis of Hierapolis was very famous, of which Cicero, Galen, but more particularly, and from his own ſight and knowledge, Strabo[c] makes mention.

Such another was the Specus Corycius in Cilicia, which, upon the account of its ſtinking deadly air, ſuch as is thought to proceed from the mouth of dragons, which the poets give to Typhon, was called Cubile Typhonis. This Pompon. Mela[d] deſcribes; and it is indeed as antient as Homer[e]: for Arima, in which he places it, was, as Euſtathius obſerves, a mountain of Cilicia.

Neither are ſuch fumes as theſe now infrequent; and tho' moſtly found in mines, pits, and other ſubterraneous places, yet they are ſometimes met with on the ſurface of the earth too, eſpecially in countries fruitful of minerals, or pregnant with imbowelled fires: ſuch are Hungary, and Italy, which latter, as Seneca[f] takes notice, has always been remarkable for them.

I ſhall therefore, having had the opportunity of making ſome remarks upon one of the moſt famous of all in thoſe parts, give as good an account as I can of that, and its manner of killing; which though I dare not affirm to be applicable to every Mephitis, yet ſeems plainly to be the caſe of moſt of them: and where it is not, this ſimple miſchief will only be found to be complicated with another; and then ſome extraordinary ſymptoms, or appearances in the animals killed, will eaſily make a diſcovery of the additional venom and malignity.

This celebrated Mofeta, taken notice of (or at leaſt ſome other hereabouts) even in the time of Pliny[g], is about two miles diſtant from Naples, juſt by the Lago d'Agnano, in the way to Pozzuolo or Puteoli, and is commonly called la Grotta de' Cani: becauſe the experiment of its deadly nature is frequently made upon dogs; though it be as certainly fatal to any other animal, if it come within the reach of its vapour. For Charles the eighth of France proved it ſo upon an aſs; and two ſlaves put into it by order of D. Pietro di Toledo, viceroy of Naples, with their heads held down to the earth, were both killed [h].

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[a] Virgil. En. vii. v. 84. — Sævamque exhalat opaca mephitim. Vid. Servium, ibid.

[b] Scaliger, Conject. in Varron.

[c] Lib. xiii.

[d] De Situ Orb. lib. i. c. 13.

[e] Εἰν Ἀρίμοις ὅθι φασὶ Τυφώεος ἔμμεναι εὐνάς. Il. ϐ. ver. 783.

[f] Nat. Quæſt. l. vi. c. 28.

[g] Nat. Hiſt. lib. ii. c. 93.

It is a ſmall grotta at the foot of a little hill, about eight feet high, twelve long, and ſix broad. From the ground ariſes a thin, ſubtle, warm fume, viſible enough to a diſcerning eye, which does not ſpring up in little parcels here and there, but is one continued ſteam, covering the whole ſurface of the bottom of the cave; and has this remarkable difference from common vapours, that it does not, like ſmoke, diſperſe itſelf into the air, but quickly after its riſe falls back again, and returns to the earth; the colour of the ſides of the grotta being the meaſure of its aſcent: for ſo far it is of a darkiſh green, but higher only common earth, and this is about ten inches. And therefore as I found no inconvenience by ſtanding in it, ſo no animal, if its head be kept above this mark, is in the leaſt injured. But when (as the manner is) a dog, or any other creature, is forcibly held below it, or by reaſon of its ſmallneſs cannot hold its head above it; it preſently, like one ſtunned, loſes all motion, falls down as dead, or in a ſwoon, the limbs convulſed and trembling, till at laſt no more ſign of life appears, than a very weak and almoſt inſenſible beating of the heart and arteries: which, if the animal be left there a little longer, quickly ceaſes too; and then the caſe is irrecoverable, as in one perfectly ſtrangled. But if it be taken out in time, and laid in the open air, it ſoon comes to life again; and ſooner, if thrown into the adjacent lake, which by conſtringing the fibres of the ſkin, in the manner of a cold bath, puts the blood again into its circulation.

It will afford ſome light towards the knowledge of the nature of this fume, to mention ſome other experiments made in the grotta [i]. A lighted torch, ſnuff and all, goes out in a moment, when dipped into the vapour.

A piſtol cannot take fire in it. If a weather-glaſs be ſo fixed, in the grotta, that the ſtagnum is wholly covered with the vapour, the quickſilver neither falls nor riſes otherwiſe than in the outward air.

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[h] L. di Capoa delle Moſet. p. 37.

[i] Addiſon's Remarks on Italy, p. 230.

In this ſhort, but accurate hiſtory of this grotta, I have ſet down thoſe particulars, which not only diſtinguiſh mephitical exhalations from common and innocent fumes, but alſo give hints ſufficient, I think, to determine the reaſon and manner of their ſurpriſing effects.

And not to ſpend time in refuting the opinion of others, I firſt take notice, that here can be no ſuſpicion of any ſuch poiſon as we have deſcribed: if there was, animals taken out of the grotta could not ſo immediately recover from the effects of it, without any remaining appearance of faintneſs and ſickneſs, or ſuch ſymptoms as are ſuffered from inſpiring air impregnated with corroſive effluvia; and theſe would certainly, in ſome degree at leaſt, infect the air in the upper part of the cave, which is always pure and fit for reſpiration. Neither could a miſchief of this kind be produced, without ſome marks of it in the creatures killed, when opened: which yet diſcover nothing extraordinary, either in the fluid or ſolid parts, except what I ſhall preſently mention in frogs.

In order therefore to underſtand wherein this deadly power conſiſts, it muſt be obſerved, that the uſe of reſpiration is twofold; the firſt, that the blood, in its paſſage through the lungs, may by the elaſticity of the air, diſtending the veſiculæ, and thus preſſing upon the arteries [k], be comminuted and broken, ſo that no coheſion of its parts may hinder the ſecretion of thoſe humours, which in the ſeveral glands are to be derived from it: the other is, that the blood may be ſupplied with ſomething from the air, whatever it be, neceſſary to life.

That there is a vivifying matter from the air, which paſſes into the blood by the breath, I have in another place [l] demonſtrated by obſerving, that the ſame quantity of it will not ſuffice long for breathing, though it be deprived of none of thoſe qualities, by which it is fitted to inflate the lungs, and agitate the blood. And likewiſe, from the experiment of Dr. Halley, who, when ſeveral fathom under water, in his diving engine, breathing an air more condenſed than the natural, found that he drew his breath more ſlowly than uſual: the reaſon of which muſt be this, that when a greater quantity of air than ordinary was taken in at a time, and conſequently the blood furniſhed with more of thoſe particles, which are neceſſary to be mixed with it, a leſs frequent reſpiration ſufficed.

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[k] Vid. Malpigh. De pulmon. & Bellin. Opuſcula.

[l] Diſcourſe on the Plague. 9th Edit. p. 45.

The caſe being thus, ſince (as we have mentioned) the mercury in the barometer is not altered in its aſcent by this vapour, that is, there is no want of gravity and elaſtic preſſure in it, at leaſt not to a conſiderable degree; we muſt conclude, that there is ſome quality in it, which, when it is drawn into the lungs, prevents and ſtops the uſual communication of the enlivening ſpirit from the air to the blood.

We have already taken notice, that there can be no real poiſon here. All that is diſcovered by the earth from which the fume ariſes, is no more than that it is of a greeniſh colour, with a ſubacid taſte, very much (as L. di Capoa obſerves) like to that of the phlegm of vitriol: ſo that it may very well be called an unctuous vapour, of the vitriolic kind, raiſed by a ſubterraneous heat.

It is certainly neceſſary to the inflation of the pulmonary veſiculæ, and the ſubſequent entrance of the ſubtile matter from the air into the blood, that the nervous liquor ſhould have a free courſe into them: it is therefore highly probable, that theſe vitriolic particles in the fume have a counteraction or repulſive force to the elaſtic matter of this liquor; by means of which the fibrillæ, into which it ſhould paſs, being deſtitute of it, become quite relaxed and loſe their force [m].

Neither muſt it ſeem ſtrange, that the animal ſpirits ſhould be ſo ſuddenly interrupted in their action, by the interpoſition of a ponderous fluid; ſince we ſee every day how inſtantaneouſly, on the other hand, their motion is quickened and revived by the application, to the noſtrils, of volatile ſalts: and it may be obſerved, that theſe are always alcaline, that is, of a nature quite oppoſite to vitriolic or acid ſpirits, ſo as readily to fall into a conflict or fermentation with them.

To conclude this part of our diſcourſe; I think it a ſufficient confirmation of this reaſoning, that in frogs killed in this grotta, the bladders of the lungs (more viſible otherwiſe and diſtinct in theſe creatures than in moſt other) were found ſubſided and quite empty of air [n]. But if any one deſires a farther proof, he may, according to theſe principles, make, as L. di Capoa did [o], an artificial Mephitis: for if antimony, biſmuth, or any other ſuch mineral, be finely powdered, and moiſtened with aqua fortis, or ſpirit of nitre; there will ariſe a great heat, with a thick dark ſmoke, in which, as in this grotta, torches are extinguiſhed, and animals, though but ſlowly, ſtifled and killed.

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[m] Vid. Eſſay V. at the end.

[n] L. di Capoa, Moſet. p. 40.

[o] Ibid. p. 128.

The mortal effects of ſubterraneous damps, in mines, deep wells, and the like cloſe places; as alſo of the fumes of confined burning charcoal, may be accounted for in the ſame way: theſe being generally acid exhalations from mineral ſubſtances [p]. And as in animals, which have died in the deſcribed grotta, the veſicles of the lungs are found ſubſided, wanting due tenſion from the animal ſpirits; ſo in the diſſection of a man killed by the vapour of wood coals, carried from a baker's oven into a deep cellar, as the ſtory is related in the Memoirs of the Royal Academy at Paris [q], the brain appeared dry, and the muſcles of the arms and thighs ſo relaxed, that they ſeemed ſeparated from the parts, to which they belonged.

But it muſt here be obſerved, that, in ſome caſes of this nature, the mineral particles are mixed with ſo ſmall a proportion of water, that, inſtead of extinguiſhing a flame, they will themſelves, like gunpowder, take fire, and burn at the approach of a candle. A famous inſtance of ſuch a vapour is given in our Philoſophical Tranſactions [r]: and an experiment, made by a mixture of oil of vitriol and filings of iron, confirms the truth of our reaſonings on this head.

Thus I have ſhewn how death may enter at the noſtrils, though nothing properly venomous be inſpired. It might perhaps be no difficult matter to ſhew, how a leſſer degree of this miſchief may produce effects, though ſeemingly very different from theſe now mentioned, yet in reality of the ſame pernicious nature: I mean, how ſuch an alteration of the common air, as renders it in a manner mephitical, (which is done by too much heat, and at the ſame time too great a proportion of watery and other groſſer particles mixt with it) may be the cauſe of epidemic diſeaſes, and, it may be, more eſpecially of thoſe, which, by reaſon of their untoward ſymptoms, are uſually called malignant.

For it is very remarkable, that Hippocrates [s] obſerved the conſtitution of the air, which preceded peſtilential fevers, to be great heats, attended with much rain and ſouthern winds: and Galen [t] takes notice, that no other than a moiſt and hot temperament of the air brings the plague itſelf; and that the duration of this conſtitution is the meaſure of the violence of the peſtilence. Lucretius [u] is of the ſame mind: for in his admirable deſcription of the plague of Athens, "Theſe diſ-"eaſes (ſays he) either come from the air, or ariſe from the "earth,"

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[p] Vid. Philoſ. Tranſ. No. 411. & 429.

[q] Ann. 1710. p. 17.

[r] No. 442.

[s] Epidem. lib. ii. & iii.

[t] Detemperament. lib. i. c. 4. & Commentar. in epidem. lib. iii.

——Ubi putrorem humida nacta eſt
Intempeſtivis pluviiſque & ſolibus icta.

In ſhort, the general hiſtories of epidemic diſtempers almoſt conſtantly confirm thus much; and would have done it more, if the vain notion of occult venoms had not prepoſſeſſed the minds of authors, and made them regardleſs of the manifeſt cauſes.

And this is notorious enough in thoſe countries, where malignant diſeaſes are moſt rife: thus it is a very common obſervation in the Eaſt-Indies, that during the dry heats the ſeaſon is healthful, but when the rains fall immediately upon the hot weather, then untoward fevers begin to threaten.

The ſame is obſerved in Africa: for (as Joan. Leo [x] relates) if ſhowers fall there during the ſultry heats of July and Auguſt, the plague and peſtilential fevers enſue thereupon, with which whoſoever is infected hardly eſcapes.

Whoever reflects on what has been ſaid of the uſe of reſpiration, and conſiders the propoſitions of Bellini, will eaſily underſtand the reaſon of theſe events.

This great demonſtrator has proved, that malignant and peſtilential fevers are owing to a viſcid and tenacious lentor or ſlime, which firſt obſtructs the capillary arteries, and afterwards, being diſſolved by heat, ferments with the blood, and changes it to a maſs unequally fluid and glutinous.

Now it is plain, that air, together hot and moiſt, not having force ſufficient to comminute the arterial fluid in the lungs, this, when it arrives at the ſecretory organs, will, inſtead of deriving into them their proper liquors, leave its moſt viſcid parts ſticking about their orifices, which by degrees make obſtructions. Theſe can only be removed by the impetus of the ſucceeding blood, and the agitation of heat: and then this ſlimy mucus, being again taken into the circulation, will, in the nature of a ferment, diſturb the whole maſs, and alter its natural properties.

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[u] Lib. vi. ver. 1099.

[x] Hiſt. Afric. lib. i. c. 1. Vid. Purchas's Pilgrims, book vi. c. 1. Dapper, De ſcriptio Afric. p. 127.

I very well know, that the authority of Hippocrates is brought to ſupport the fancy of a latent ærial poiſon in ſome of theſe diſtempers: his Θεῖόν τι (ſomething divine [y]) is conſtrued in this ſenſe. But his beſt interpreter, Galen, underſtood by this expreſſion no ſuch thing as they mean: on the contrary, he ſays it is a manifeſt conſtitution of the air, prevailing unſeaſonably, ſuch as himſelf has deſcribed in his Aphoriſms [z]; and which is the ſame with that of which we are diſcourſing.

Minadous [a] therefore rightly remarks, that, in his whole epidemics, Hippocrates never once mentions any venom as the cauſe of malignant diſeaſes; and, as to any thing really divine, the wiſe old man in other treatiſes [b] expreſsly teaches, "That no diſeaſe comes from the gods, one more than another, each acknowledging its own natural and manifeſt "cauſe."

But it is foreign to our purpoſe to enlarge on this ſubject. I ſhall only hint, that phyſicians ought therefore to be very cautious in giving, as they often do, in caſes of this nature, under the notion of Alexipharmacs, ſuch medicines as raiſe a great heat both in the ſtomach and blood. Having engaged the animal ſpirits in war with malignities, they too often ſend treacherous auxiliaries to the ſuppoſed weak party; and, by exciting new tumults and diſorders, check and interrupt the work of nature, which always endeavours to conquer its enemy by critical diſcharges.

It muſt indeed be owned, that ſome malignant fevers are contagious, and that contagion is a real poiſon: but the original cauſe of a diſeaſe, and the communication of it, are very different things. Of this I have largely diſcourſed on another occaſion [c]: I ſhall therefore only hint here, that when a fever is communicated by way of infection from one already diſeaſed, this moſt commonly happens at the latter part of the diſtemper; that is, (as was obſerved in the Hydrophobia) when the fermenting blood is throwing off great quantities of its active particles upon the glands of the moſt conſtant and eaſy ſecretions: ſuch are thoſe in the ſurface of the body and the mouth. Theſe therefore being by the air drawn into the lungs of a ſound perſon, and likewiſe inſinuating themſelves into the pores of the ſkin, will affect firſt the nervous fluid, and then the blood, and produce the like fermentation and diſorder, which had been bred in the body from which they aroſe.

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[y] Vid. Prognoſtic. & Galen. Comment.
[z] Sect. iii. Aph. 11.
[a] De febre malign. lib. i. c. 8.
[b] De ære, aquis & locis, & De morbo ſacro.
[c] Diſcourſe on the Plague.

The way, by which bad food, ill ripened fruits of the earth, &c. do often produce malignant and peſtilential diſeaſes, is not very different from that, by which we have obſerved unwholeſome airs to be the cauſe of the like effects. For the juices, with which thoſe ſupply the blood, being corrupted, muſt neceſſarily make a fluid neither fit for nutrition nor the animal ſecretions: and it is therefore no wonder, if, beſides the other ſymptoms enſuing, ſore puſtules, inflammations, ulcers, &c. (more common in fevers from this cauſe than in any other) are raiſed in the ſurface of the body.

It is upon this account, that a famine is very often ſucceeded by a peſtilence. And this calamity generally begins among the poorer ſort of people, whoſe diet to be ſure is the worſt.

It is a conſtant obſervation in countries ſubject to the plague, as Turky and Africa, that when the common inhabitants die in great numbers, foreigners who live in plenty, if they avoid communication with the infected, eſcape the danger.

Thus much concerning poiſonous exhalations and airs, ſo far as the conſideration of the grotta de' cani has led us on to enquire into their effects. For though there may be other alterations of this ſame element, differing in their nature from this we have inſiſted upon, and yet equally pernicious and hurtful; yet we take no notice of any of them, in regard that thoſe which are from the arſenical, mercurial, and the like fumes, are reducible to a foregoing Eſſay: and thoſe, which are owing to a change of the known properties of the air, may be eaſily explained, by what has been already delivered in this. I ſhall therefore rather chuſe to make ſome remarks on the miſchief of another fluid, which as it is the next in uſe to this we have been treating of, ſo the bad qualities of it, when it comes to be altered, muſt neceſſarily be almoſt equally fatal and dangerous.

I mean water, which is of ſo conſtant ſervice, not only for our drinks, but alſo in preparing of our fleſh and bread, that it may juſtly be ſaid to be the vehicle of all our nouriſhment: ſo that whenever this happens to have other properties than are neceſſary to fit it for this purpoſe, it is no wonder if in its paſſage through the body theſe make ſuitable impreſſions there.

Thus at Paris, where a part of the city is ſupplied with a water from Arcueil, which is ſo full of ſtony particles, that even the pipes, through which it runs, are in time incruſted and choked up; Dr. Liſter has obſerved, that the inhabitants are more ſubject to the ſtone in the bladder, than in moſt other places [d].

In like manner, let the groſs particles, with which the water is ſaturated, be of any other nature, metallic, ſaline, &c. theſe, according to their various gravity, the capacity of canals, and ſuch like circumſtances, will, when they come to circulate in the animal body, be by the laws of motion depoſited in one part or other. So thoſe mineral bodies, and nitrous ſalts, which abound in the ſnowy waters of the Alps, do ſo certainly ſtuff and enlarge the glands of the throat in thoſe who drink them, that ſcarce any who live there are exempted from this inconvenience [e].

For this reaſon, the choice of water for drink among the antients was by weight, the lighteſt being preferred, as moſt free from all heterogeneous bodies.

The caſe therefore of poiſonous ſprings is, their having corroſive corpuſcles mixt with their water, which cannot fail, when forſaken of their vehicle in the canals of the body, to do the ſame miſchief as they would, if taken by themſelves undiluted: only with this difference, that they may in this form be carried ſometimes farther into the animal œconomy, and ſo, having paſſed the primæ viæ, diſcover their malignity in ſome of the inmoſt receſſes. Thus the fons ruber in Æthiopia, mentioned by Pliny [f], about which abundance of native minium or cinnabar was found, ſhewed its ill effects chiefly on the brain: and therefore Ovid [g] ſays of it,

——— *Si quis faucibus hauſit,*
Aut furit, aut patitur mirum gravitate ſoporem.

We ſhall not need then to enlarge on this matter; ſince any of the forementioned mineral poiſons may thus impart their deadly quality to waters; and accordingly there are inſtances of arſenical, mercurial, &c. fountains, of which the hiſtories may be ſeen in the collections of the learned Baccius [h]; and one very remarkable in the Philoſophical Tranſactions [i].

But as we before took notice concerning airs, ſo it may be worth the while to obſerve of waters; that there are ſome alterations of them, which though not properly poiſonous, yet are of ſo great conſequence in their effects, that they may very well deſerve to be regarded.

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[d] Vid. Liſter's Journey to Paris.

[e] *Quis tumidum guttur miratur in Alpibus?* Juvenal. Satyr. xiii.

[f] Lib. xxxi. c. 2.

[g] Metamorph. lib. xv. ver. 320.

[h] De Therm. lib. vi.

[i] Number 8.

This I ſhall do with reſpect to a great abuſe, committed in this kind about the city; and that is, in chuſing ſometimes ſtagnating impure well-water for the brewing of beer, and making other drinks. Such a fluid indeed, has oftentimes a greater force and aptneſs to extract the tincture out of malt, than is to be had in the more innocent and ſoft liquor of rivers: but for this very reaſon it ought not, unleſs upon mere neceſſity, to be made uſe of; this quality being owing to the mineral particles and aluminous ſalts, with which it is impregnated.

A late author [k], by ſearching into the firſt accounts of the diſtemper we call the ſcurvy, deſcribed by Pliny [l] and Strabo [m], under the promiſcuous names of ſtomacace and ſcelotyrbe; and examining the authentic hiſtories of it in later years, made by the moſt obſerving phyſicians in thoſe countries, where it was unhappily revived, as Olaus Magnus, Balduinus, Ronſeus, J. Wierus, Solomon Albertus, &c. finds that the origin of it was in all times and places charged upon the uſe of unwholeſome ſtagnating waters. Then by comparing together the clayey ſtrata of the earth about the cities of London, Paris, and Amſterdam, he ſhews, that where the water is worſt, there this malady is moſt rife. So that he has put it out of all doubt, that moſt of the perplexed and complicated ſymptoms, which are ranged under this one general name, are in a great degree owing to the ill qualities of this element.

And indeed Hippocrates himſelf, as he has very plainly deciphered this diſeaſe [n], by the title of σπλῆνες μέγαλοι, or great ſpleens; ſo he does very particularly in another treatiſe [o] take notice, that drinking of ſtagnating well-waters muſt neceſſarily induce an ill diſpoſition both of the ſpleen and belly.

If we enquire into the reaſon of ſuch ill effects, we muſt conſider, that clay is a mineral glebe, and that the groſs particles and metallic ſalts, with which waters paſſing through ſuch a bottom abound, are, as Dr. *Lyſter* [p], obſerves, not to be maſtered; that is, indigeſtible in the human body. Not only therefore will theſe cauſe, as he very well argues, calculous concretions in the kidneys, bladder, and joints, and as Hippocrates experienced, hard ſwellings in the ſpleen; but they muſt neceſſarily oftentimes by their corroſive quality twitch and irritate the ſenſile membranes of the ſtomach and bowels, and thus hinder and interrupt the digeſtion of our food. Nay, beſides all this, when they come into the blood, it is no wonder, if the ſmall canals of inſenſible perſpiration are frequently ſtopt and obſtructed by them: for it is upon this ſcore that Sanctorius[q] teaches us, "that heavy water "converts the matter of tranſpiration into an ichor, which "being retained, induces a cachexy."

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[k] Dr. J. H. Scelera aquarum: or, a Supplement to Mr. Graunt on the bills of mortality.

[l] Lib. xxv. c. 3.

[m] Geogr. lib. vi.

[n] Prorrhet. lib. ii. c. 16.

[o] De ære, aquis, & locis, ſub finem.

[p] De fontib med. Angl. p. 2. pag. 75. At foſſilia ſive metallica ſalia alia atque alia ſunt, & nobis & pene igni dixeram indomabilia.

What miſchiefs will enſue hereupon, every one ſees; not only pains in the limbs, livid ſpots in the ſurface of the body, ulcers, &c. from the acrimony of the undiſcharged moiſture; but many beſides of thoſe nervous complaints, which go by the name of hyſterical and hypochondriacal, may take their riſe from the ſame ſource: for the before cited Sanctorius[r] has remarked, that the flatus or wind, ſo inſeparable from thoſe caſes, is no other than "the fluid of perſpiration rude "and unfiniſhed."

If theſe inconveniences are oftentimes not felt, at leaſt not till towards the declining age, in ſtrong and active habits of body; yet I am, from very good experience, aſſured, that they deſerve conſideration in weaker conſtitutions, and a ſedentary life, eſpecially of the more tender ſex.

For theſe reaſons Pliny[s] tells us, "that thoſe waters are "condemned in the firſt place, which, when boiled, incruſ"tate the ſides of the veſſels." And that our well-waters do this, no body who looks into the common tea-kettles, can be ignorant.

And indeed in antient times, as that part of medicine, which relates to diet, was more carefully ſtudied, than it is now; ſo this point particularly, of which we are treating, was of ſo great moment, that Hippocrates, who wrote the beſt book[t] on the ſubject that ever was publiſhed, has in a great meaſure accounted, not only for the diſeaſes, but even for the temper and diſpoſition of the people of ſeveral countries, from the difference of their airs and waters.

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[q] Medic. Static. §. ii. Aphor. 6.

[r] Ibid. §. 3. Aph. 13. Flatus nil aliud eſt quam rude perſpirabile.

[s] Lib. xxxi. c. 3. Damnantur imprimis fontes, quorum aquæ decoctæ craſſis obducunt vaſa cruſtis.

[t] De ære, aquis, & locis.

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Tab. III.

Fig. 4.

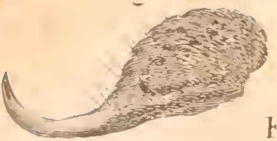
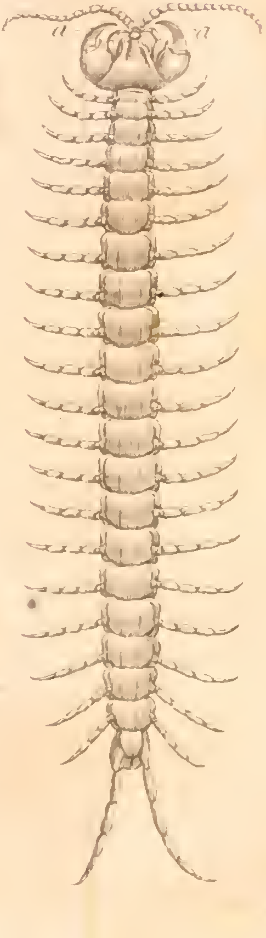


Fig. 1.



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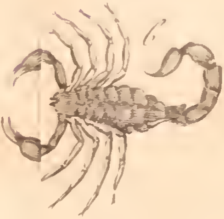
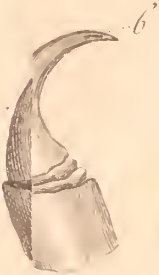


Fig. 2.



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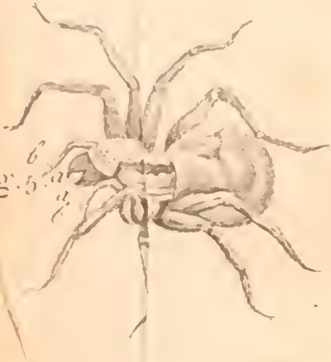

Tab. IV.

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Fig. 1.

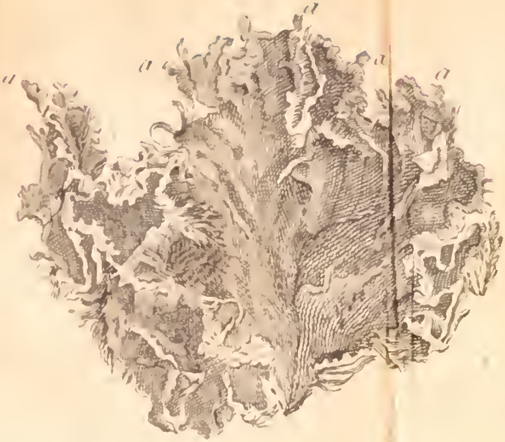


Fig. 2.

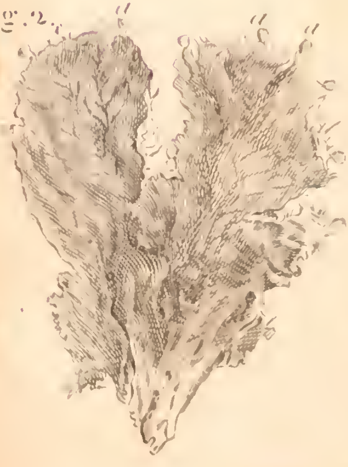
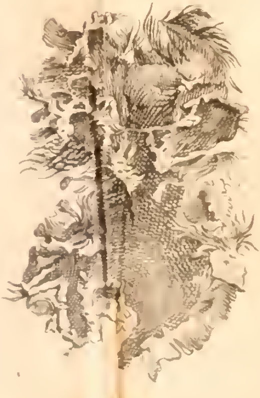


Fig. 3.



The explication of thoſe Figures, which are not explained in the Treatiſe.

TABLE III. The Scolopendra.

FIG. 1. *a a.* The claws of the poiſoning forceps.

Fig. 2. One of the claws magnified, in which appears the aperture *b.*

Fig. 3. The Scorpion. *a a.* The claws. *b.* The tail with the ſting at the end.

Fig. 4. The ſting magnified, to ſhew one of the ſlits, out of which iſſues the poiſon *a*.

Fig. 5. The Tarantula. *a a.* The wounding forceps. *b b.* The feelers.

TABLE IV.

Fig. 1. The upper part of an expanded leaf of the lichen. *a a.* The peltæ or ſeminal capſulæ, at the extremities of the leaves.

Fig. 2. The under ſide of the ſame leaf, with the peltæ.

Fig. 3. A view of a leaf, as it lies on the ground unexpanded.

A
TREATISE
Concerning the
INFLUENCE
OF THE
SUN and MOON
UPON
HUMAN BODIES,
AND
The DISEASES thereby produced.

I

ADVERTISEMENT.

HAVING reſolved, at the inſtance of ſome friends, to give a ſecond edition of this ſmall Treatiſe, I thought it incumbent on me, to read it over attentively; in order to make ſuch additions and improvements, as above forty years experience might have ſuggeſted to me ſince its firſt publication. Accordingly, in this review, I have explained ſome mathematical matters in a clearer manner than I had formerly done; and I have illuſtrated and confirmed the medicinal part by ſeveral additional obſervations and caſes, which may prove uſeful in the practice of phyſic. And indeed, that a due conſideration of this ſubject is extenſively uſeful to a phyſician, will appear with ſufficient evidence, from the various kinds of diſeaſes, the courſes and returns of which I have herein ſhewn to depend on the different poſitions and revolutions of the Sun and Moon. Now, though a previous acquaintance with the mathematical principles of natural philoſophy be requiſite for comprehending this ſubject in its full extent; yet as thoſe, who are little affected by geometrical demonſtrations, may poſſibly be convinced by a number of facts, I ſhall not, with reſpect to this little work, inſiſt on that ſaying of Plato:

ΟΥΛΕΙΣ ΑΓΕΩΜΕΤΡΗΤΟΣ ΕΙΣΙΤΩ.

Let none unſkilled in geometry enter here.

London,
July 1, 1746.

PREFACE.

AS the ſtudy of phyſic has in all Ages undergone various changes, according to the different opinions of philoſophers; I have often wondered, how it comes to paſs, that, notwithſtanding the conſiderable advances made in the ſtudy of nature by the moderns, eſpecially in the laſt century, this uſeful art has not received thoſe benefits, which might reaſonably be expected from a ſurer method of reaſoning, than men were formerly acquainted with. That ſome of the moderns, particularly Galilei, Kepler, Torricelli, and Sir Iſaac Newton, have made vaſt improvements in natural philoſophy, by joining mathematical reaſonings to their enquiries into nature, is well known to the learned world: and yet medicine ſtill deals ſo much in conjecture, that it hardly deſerves the name of a ſcience. Whether this be owing to the nature of the art, as being incapable of ſure principles; or rather, to the artiſts, who having got into a wrong track, will not take the pains to return into the right road; may poſſibly be a matter of enquiry on ſome other occaſion. In the mean time, in order to prove how beneficial the ſtudy of geometry muſt be to phyſicians, as well for inveſtigating the cauſes of diſeaſes, as for finding proper remedies for them; I have attempted to explain a very difficult queſtion, concerning the courſes and returns of ſome diſtempers; the nature of which is ſuch, that it cannot be thoroughly well handled by any other means.

Thus I am neceſſitated, in this diſquiſition, to enter into a few more minute calculations, than a medical ſubject might ſeem to require. Wherefore the reader ought to have ſome knowledge of Sir Iſaac Newton's philoſophy; or at leaſt, underſtand the learned and ſagacious Dr. Halley's Theory of the Tides, upon the principles of that great philoſopher, as publiſhed in the Philoſophical Tranſactions And thoſe, who have no taſte for mathematical ſtudies, may, if they pleaſe, paſs over this part of the work. For my part, I never expect to acquire reputation by algebraical calculations, thoroughly ſenſible of the mediocrity of my genius in that branch of learning. But I flatter myſelf, that theſe ſheets will be found to contain ſome hiſtories and inſtructions, from which even thoſe, who deſpiſe all reaſoning in phyſic, and rely on experience

alone,

alone, will reap benefit in practice : which indeed is the main deſign of this little Treatiſe.

The field is large, in which we run our career ; nor are the innumerable evils, with which we are daily ſurrounded, to be remedied by any one method. The two great pillars of medicine are experience and and reaſon ; and he that has no confidence in the latter, at leaſt bids the fairer towards relieving the ſick, in proportion to his ſtock of the former. But yet the buſineſs of our profeſſion requires the joint aſſiſtance of both ; becauſe a rational theory will teach a man to apply his experimental knowledge to the various caſes that occur.

For although a very few remedies, found out by chance, and confirmed by uſe, might poſſibly have been ſufficient for curing the diſorders of men in the earlieſt times, who, we are told, led ſober and active lives ; yet in ſucceeding ages, when their conſtitutions had been injured by ſloth and luxury, they ſtood in need of different methods of cure : inaſmuch as it now became neceſſary to enquire, not only into the cauſe of the diſtemper, but alſo how its nature and uſual appearance had been changed in this or that individual. Hence that ſaying of Hippocrates [a] : The phyſician ſhould have an eye to things common and peculiar : becauſe, as Celſus rightly obſerves, there are caſes, in which the ſame diſorder puts on a different appearance from that, which it uſually has ; and the diſcovery of the cauſe is ſometimes the cure of the diſtemper [b].

And it is probable, that the only reaſon, why the profeſſion of phyſic lay buried in total darkneſs for near five hundred years, that is, from the Trojan to the Peloponneſian war, as Pliny has recorded [c] ; was, that, whereas new diſeaſes ſtarted up from time to time, and thoſe, who had nothing but experience to make them phyſicians, were unequal to theſe new difficulties ; the philoſophers engroſſed the art, which was found to be lame and infirm without the knowledge of nature. Thus Celſus ſays of that ſpace of time, that the ſcience of phyſic was accounted a part of philoſophy ; ſo that the curing of diſeaſes, and the contemplation of nature, took their riſe from the ſame perſons [d]

Now, as it is of conſequence to the ſubject in hand, ſo it is eaſy to prove, that thoſe philoſophers, who laid the firſt foundations of our art, were really famous geometricians.

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[a] Epidem. lib. I. [b] In præfat. [c] Lib. xxxix. in prœm. [d] Loco citato.

And firſt, the moſt eminent among the ſages of antiquity was Pythagoras, who had acquired ſuch high reputation for his ſkill in phyſic, that it was commonly ſaid, that he travelled, not ſo much for the ſake of inſtructing people, as of curing them [e]. But the progreſs made by him in methematical ſtudies alſo was extraordinary. Witneſs his two noble diſcoveries; the one, Of the ſquare deſcribed upon the ſide ſubtending the right angle in a right-angled triangle, being equal to both the ſquares deſcribed upon the ſides containing the right angle; the other, Of the area of the parabola, which, according to Proclus [f], he firſt demonſtrated. For the firſt of theſe problems, Athenæus [g] and Diogenes Laertius [h], upon the authority of Appollodorus the arithmetician, ſay, that he offered a hecatomb in ſacrifice. But Plutarch [i], after citing a verſe of Apollodorus, leaves it doubtful for which of the two he made that offering.

Empedocles was his diſciple in Italy, a perſon of a vaſt genius, who, having penetrated into nature's inmoſt receſſes, performed ſuch great things in our profeſſion, as were not to be expected from a bare experimental knowledge of phyſic. For when his native city Agrigentum was infected with a dreadful plague, he ſoon found out the cauſe; and thereupon by ſtopping up ſome openings in the mountains, through which unwholeſome winds iſſuing brought the contagion, he averted the evil [k]. He rendered the ſame ſervice to the Selinuntians: for when they were ſeized with a plague from the corruption and ſtench of the ſtagnating waters of a river, which ſurrounded the city; he ordered two neighbouring rivers to be conveyed into it: by which means, having made a current, and cleanſed the channel, the waters gradually grew ſweet, and the plague ceaſed [l]. Now theſe facts are the more worthy of being recorded; becauſe the ancients were generally of opinion, that peſtilence proceeded from the anger of the gods, and therefore was not to be cured by natural remedies: whereas in both theſe caſes, the remedies were pointed out by mechanical reaſoning; and that calamities of this kind are owing to ſuch cauſes, is confirmed by a great number of obſervations publiſhed by various authors.

Democritus, who is thought by ſome to have been Hippocrates's maſter, was equally famous for geometry and phyſic.

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[e] Ælian. var. Hiſt. lib. iv. cap. 17. [f] Lib. iv. ad primum Euclid. [g] Lib. x. pag. 418. [h] In vita Pythagoræ, lib. viii. ſegm. 12. [i] Quod ne vivere jucunde quiſquam poſſit, qui ſectam ſequatur Epicuri. [k] Idem, de curioſitate, & Lib. contra Coloten. [l] Vid. Diog. Laert. lib. viii. ſegm. 70.

For he is ſaid to have written, among other things, Of the contact of the circle and ſphere; Of geometry; Of incommenſurable lines: as alſo, Of the nature of man; Of the humors; and, Of plagues [m].

By thoſe great men, and others like them, was this profeſſion carried on to the time of Hippocrates; who, as Celſus ſays, was the firſt that ſeparated this art from philoſophy [n]. For he, plainly perceiving, that the ſuperſtition of the common people, the impudence and vain pretences of quacks, and the pride and vanity of the ſophiſts, were mighty obſtacles to the improvement of the art; propoſed to himſelf in all his writings, to guard againſt thoſe impediments and difficulties. And accordingly, in his valuable book De morbo ſacro, he teaches how to obviate falſe religious notions: and is very copious in detecting the frauds and fallacies of thoſe men, who covered their ignorance with a veil of piety, making profeſſion of charming away thoſe diſeaſes, which they could not procure by medicines. In his books De arte, De decoro, De præceptionibus, he diſputes, not only againſt thoſe, who denied that phyſic was an art, and therefore had no regard to any thing but experience; but alſo againſt thoſe, who practiſed upon a wrong plan. And becauſe the divine old man is made a tool by contending parties for their reſpective notions; I cannot avoid obſerving, that mechanical reaſoning is every where approved and recommended in thoſe treatiſes by that great parent of medicine. For he ſays: I praiſe reaſoning, when it is grounded on ſuch principles as fall under our ſenſes, or are proved by experiments; and draws concluſions from manifeſt premiſes. But if it is carried on by unjuſt deductions, and is built upon fictitious opinions, it occaſions great trouble and difficulties [o]. And this ſentiment is illuſtrated and confirmed in his book De priſca medicina: where after ſaying, that moſt phyſicians are very like unſkilful pilots, whoſe ignorance of their art is not diſcovered, while the veſſels ſail in good weather before the wind; but if a ſtorm ariſe, then it ſoon appears, that their blunders were the cauſe of the ſhip-wrecks which happen: he tells us, that our chief care ſhould be to learn the properties of things, not by imagining or contriving, but by finding out the powers, which they are endowed with, and exerciſe on our bodies; in which enquiry great regard muſt be paid both to the qualities of the humors, and to the figures of the parts: ſome of which from a wide beginning run into a narrow apex, others are more and more expanded; ſome are ſmooth and cylindrical; ſome denſe or firm, others in fine thin and lax. This is the wiſdom, which ought to accompany the ſtudy of medicine; by means of which, he ſays, the artiſt becomes equal to the gods[p].

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[m] Idem, in vita Democriti, lib. ix. ſegm. 46 & 47. [n] In præfatione. [o] Lib. de præcept.

But I ſhall enlarge no farther at preſent on this theme. However it manifeſtly appears from what has been hitherto ſaid, that Hippocrates gave the name of Sophiſts[q] to thoſe, who argued on fictitious principles; and that of real phyſicians[r] to thoſe, who reaſon from the laws of nature, and a knowledge of the animal fabric. Which I obſerve for the ſake of thoſe, who, as if there was no difference between the groundleſs hypotheſes of philoſophers, and the certain concluſions of geometricians, hold this moſt uſeful ſcience in contempt, and even turn it into ridicule before the ignorant multitude. But ſurely theſe apply themſelves both to philoſophy and phyſic, without having any genius to either; for want of which they cannot diſcern the wide diſtance between ſophiſtical opinions and geometrical reaſonings. For he, who builds an hypotheſis, follows plauſibility, and thinks it ſufficient, if he can account for appearances from his principles: whereas mechanical theory deals in demonſtrations, which the able geometrician deduces either from the figures of bodies, or from the known laws of motion, by neceſſary conſequences.

Examples will ſet this matter in a clearer light. Des Cartes compiled a ſet of ſuſpicions and conjectures on the gravity of bodies, and yet made no proficiency thereby in the knowledge of nature: but Sir Iſaac Newton, by purſuing its laws in a geometrical manner, without any regard to the cauſe, laid open to our contemplation the real fabric of the world. Doctor Willis invented an idea of ſoporiferous diſeaſes; from which we learn, that the author had words at will, but knew nothing of the nature of thoſe diſeaſes: whereas Bellini, by bringing their hiſtory and ſymptoms under mechanical reaſonings, paved the way to the knowledge and cure of thoſe great evils. But enough of this ſubject.

When I had communicated my intention of publiſhing this piece to my friend the celebrated Dr. Pitcairne, he not only applauded my deſign, but, of his great humanity, readily ſent me ſome hiſtories of periodical diſeaſes out of his large ſtock. Thoſe I have ranged in their proper places, as conſiderable ornaments to my little book, not without a ſenſe of pleaſure, in ſeeing my opinion confirmed by the teſtimony of ſo great a

[p] Lib. de decoro.

[q] Σοφιστὰς

[r] Ἔργῳ ἰατροὺς.

maſter in theſe ſtudies ; and the rather, becauſe it was proper to produce the obſervations of others, as well as my own, in ſupport of this new theory. And I may not conceal in this place, that our diſſertation diſplays, not a little, the wiſdom, goodneſs, and wonderful contrivance of the omnipotent Creator of the world ; who, while he made ample proviſion for all living things, eſtabliſhed this difference between brutes and rational creatures ; that whereas thoſe enjoy the common gifts of nature, he has permitted us, beſides, to inveſtigate their properties and uſes, and to contemplate the labyrinth of his divine works.

Laſtly, I have but lightly touched upon the cure of the caſes related in this treatiſe ; becauſe I intend, whenever I find ſufficient leiſure, to publiſh the moſt remarkable obſervations which I have already, or may hereafter make on moſt diſeaſes.

London,
A. D. 1704.

A TREATISE Concerning the INFLUENCE of the SUN and MOON upon HUMAN BODIES, &c.

CHAP. I.

That the Sun and Moon cauſe various alterations in the Human Body, according to their different poſitions with reſpect to the earth.

IT was the general opinion of the ancient phyſicians, that ſome diſeaſes are entirely owing to the influence of the celeſtial bodies, and that the paroxyſms and periods of others are regulated by the action of the moon in particular : wherefore the earlieſt hiſtories of Epidemics, which have been handed down to us, are full of the motions and powers of thoſe luminous orbs. Upon this principle it is, that Hippocrates adviſes his ſon Theſſalus to the the ſtudy of numbers and geometry [a]: becauſe, ſays he, the riſing and ſetting of the ſtars have a great effect on diſtempers [b].

But when incourſe of time medicine began to be accommodated to the reaſonings of philoſophers ; no body being able to account for the manner of this celeſtial action, and the rule of obſervation being gradually laid aſide, it was allowed no farther ſhare in affecting our health, than what might be imputed to the changes in the manifeſt conſtitution of the air : excepting perhaps ſomething of truth, which ſtill remains diſguiſed and blended with the jargon of judicial aſtrology.

In order therefore to ſet this obſcure and difficult matter in a little clearer light, I ſhall in the firſt place endeavour to ſhew, that the Sun and Moon, regarding their nearneſs and direction to the earth only, beſides the effects of heat, moiſture, &c. thereby cauſed in our atmoſphere, muſt at certain times make ſome alterations in animal bodies; then enumerate ſome hiſtories and obſervations of ſuch changes, and enquire of what uſe ſuch thoughts as theſe may be in the practice of phyſic.

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[a] Epiſt. ad Theſſalum.

[b] De aëre, aquis, & locis.

It is a conſtant obſervation of thoſe, who have written the hiſtory of the winds, that the moſt windy ſeaſons of the year are the times about the vernal and autumnal equinox. Every body likewiſe knows, that in the moſt quiet weather there is generally ſome breeze at mid-day and mid-night, as alſo at full ſea; that is, always about the time when the Sun or Moon arrives at the meridian, either over or under our hemiſphere. Seamen and country people reckon upon this, and order their affairs accordingly. And the changes of the weather, as to winds or calms, eſpecially about the new and full Moon, are too well known to require any authority to confirm ſuch remarks. Thoſe, who deſire a fuller account of theſe obſervations, may ſee it in J. Goad's Aſtrometeorologia [c]. Theſe things being matters of fact, and in a manner regular and univerſal, it may very well ſeem ſtrange, that philoſophers have not been more accurate in their enquiries into the reaſon of ſuch appearances. True indeed it is, that the origin of winds is various and incertain; but however, ſo conſtant and uniform an effect, muſt undoubtedly be owing to one neceſſary cauſe.

It has been, now a conſiderable time ſince, ſufficiently made out, that our atmoſphere is a thin elaſtic fluid, one part of which gravitates upon another, and whoſe preſſure is communicated every way in a ſphere to any given part thereof. From hence it follows, that if by any external cauſe the gravity of any one part ſhould be diminiſhed, the more heavy air would ruſh in from all ſides around this part, to reſtore the equilibrium, which muſt of neceſſity be preſerved in all fluids. Now this violent running in of the heavier air would certainly produce a wind, which is no more than a ſtrong motion of the air in ſome determined direction. If therefore we can find any general cauſe, that would, at theſe ſtated ſeaſons, which we have mentioned, diminiſh the weight or preſſure of the atmoſphere; we ſhall have the genuine reaſon of theſe periodical winds, and the neceſſary conſequences thereof.

The flux and reflux of the ſea was a phænomenon too viſible, too regular, and too much conducing to the ſubſiſtance of mankind, and all other animals, to be neglected by thoſe, who applied themſelves to the ſtudy of nature: however, all their attempts to explain this admirable contrivance of infinite wiſdom were unſucceſsful, till Sir Iſaac Newton revealed to the world juſter principles; and by a truer philoſophy, than was formerly known, ſhewed us how, by the united or divided forces of the Sun and Moon, which are increaſed and leſſened by ſeveral circumſtances, all the varieties of the tides are to be accounted for. And ſince all the changes, we have enumerated in the atmoſphere, do fall out at the ſame times, when thoſe happen in the ocean; and likewiſe whereas both the waters of the ſea, and the air of our earth, are fluids ſubject, in a great meaſure, to the ſame laws of motion; it is plain, that the rule of our great philoſopher takes place here, viz. that natural effects of the ſame kind are to be attributed, as much as poſſible, to the ſame cauſes [d].

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[c] London, 1690, 4°.

What difference that known property of the air, which is not in water, makes in the caſe, I ſhall ſhew anon. Setting aſide the conſideration of that for the preſent, it is certain, that as the ſea is, ſo muſt our air, twice every twenty-five hours, be raiſed upwards to a conſiderable height, by the attraction of the Moon coming to the meridian; ſo that inſtead of a ſpherical, it muſt form itſelf into a ſpheroidal figure, whoſe longeſt diameter, being produced, would paſs through the Moon. That the like raiſing muſt follow, as ſoon as the Sun is in the meridian of any place, either above or below the horizon; and that the Moon's power of producing this effect exceeds that of the Sun, in the proportion of 4½ to 1 nearly. Moreover, that this elevation is greateſt upon the new and full Moons, becauſe both Sun and Moon do then conſpire in their attraction: leaſt on the quarters, in that they then drawing different ways, it is only the difference of their actions that produces the effect; laſtly, that this intumeſcence will be of a middle degree, at the time between the quarters, and new and full Moon. The different diſtances of the Moon in her perigæum and apogæum, likewiſe increaſe or diminiſh this power. Beſides, the Sun's leſſer diſtance from the earth in winter is the reaſon, that the greateſt and leaſt attraction of the air upwards more frequently happens a little before the vernal, and after the autumnal equinox. And in places where the Moon declines from the equator, the attraction is greater and leſſer alternately, on account of the diurnal rotation of the earth on its axis.

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[d] Newton. Princip. pag. 387.

Whatever has been ſaid on this head, is no more than applying, what Sir Iſaac Newton has demonſtrated of the ſea, to our atmoſphere; and it is needleſs to ſhew, how neceſſarily thoſe appearances, juſt now mentioned of winds, at the ſtated times, muſt happen hereupon. It will be of more uſe to conſider the proportion of the forces of the two luminaries upon the air, to that which they have upon the waters of our globe: that it may the more plainly appear, what influence the alterations hereby made muſt have upon the animal body.

Sir Iſaac Newton has demonſtrated [e], that the force of the Sun to move the ſea, is to the force of gravity, as 1 to 12868200. Let this be

$$S : G :: 1 : n. \quad \text{Hence, } S = \frac{G}{n}.$$

And that the force of the Moon to raiſe the ſea is to gravity, as 1 to 2871400. Let this be

$$L : G :: 1 : s. \quad \text{Hence, } L = \frac{G}{s}.$$

And ſince the centrifugal force of the parts of the earth, ariſing from its diurnal motion, is to gravity, as 1 to 289; let this be

$$C : G :: 1 : e. \quad \text{Then } C = \frac{G}{e}.$$

Hence,

$$S + L : C :: \frac{G}{n} + \frac{G}{s} : \frac{G}{e} :: \frac{1}{n} + \frac{1}{s} : \frac{1}{e} ::$$

$$1 : \frac{sn}{s + n \times e} :: 1 : 8123.$$

The ſame philoſopher has taught us, that the centrifugal force raiſes the water at the equator above the water at the poles, to the height of 85472 feet [f]. Wherefore if that force, which is as 8123, raiſes the ocean to 85472 feet; the united forces of the Sun and Moon, which are as 1, will raiſe the ſame to $10\frac{1}{2}$ feet:

$$\text{for } \frac{85472}{8123} = 10\tfrac{1}{2} \text{ nearly.}$$

[e] Princip. lib. iii. Prop. 36. & 37.

[f] Ibid. lib. iii. Prop. 37.

Now, we know that the more eaſily the water can obey the attraction, with the more force are the tides moved: but ſince, as the ſagacious Dr. Halley has determined it, our atmoſphere is extended to forty-four miles, whereas the middle depth of the ocean is but about half a mile; it is plain, that the air, revolving in a ſphere about a hundred times larger than that of the ocean, even ſuppoſing the whole terreſtrial globe covered with water, will have a proportionably greater agitation. Beſides rocks, ſhelves, and the inequality of ſhoars are a great ſtop to the acceſs and receſs of the ſea: but nothing repels the riſing air, which is alſo of ſuch thinneſs and fluidity, that it is eaſily driven, and runs every way.

Nor ought we to omit, that it is the univerſal law of bodies attracted, that the force of attraction is reciprocally as the ſquares of their diſtances; ſo that the action of the Sun and Moon will be greater upon the air, than upon the water, upon the account of its nearneſs. But the conſideration of the elaſticity is ſtill of greater moment here: of which this is the nature, that it is reciprocally as the preſſure: ſo that the incumbent weight being diminiſhed by the attraction, the air underneath will upon this ſcore be mightily expanded. True it is indeed, that this preſſure diminiſhes gradually, in ſuch ſort, that it is of no moment beyond a certain diſtance from the earth: but yet a ſmall alteration therein produces a very conſiderable effect; becauſe thereby our ambient air the more readily yields to the attractive faculty.

Theſe and ſuch like cauſes will make the tides in the air from the Moon's attraction, to be much greater than thoſe of the ocean. Nor is it neceſſary to our purpoſe to determine, by nice calculations, their particular forces: it is ſufficient to have proved, that theſe motions muſt both be univerſal, and alſo return at certain intervals.

Now, ſince the raiſing of the water of the ocean to ten feet and a half, produces torrents of ſuch a prodigious force; we may eaſily conceive what tempeſts of winds, if not otherwiſe checked, the elevation of the air much higher, perhaps above a mile, will neceſſarily cauſe. And there is no doubt to be made, but that the ſame infinitely wiſe being, who contrived the flux and reflux of the ſea, to ſecure that vaſt collection of waters from ſtagnation and corruption, which would inevitably deſtroy all the animals and vegitables on this globe; has ordered this ebb and flood of the air of our atmoſphere, with the like good deſign; that is, to preſerve the ſweet freſhneſs, and briſk temper of this fluid, ſo neceſſary to life; and keep it, by a kind of continual circulation, from deadneſs and ſtinking. We daily feel the benefits of this wonderful contrivance; but I cannot find, that the manner of it has been hitherto accounted for. And yet no ſubject better deſerved the ſerious conſideration of phyſicians: ſince it has been obſerved, that people recover ſpeedily from waſting chronical diſeaſes in clear open air; and that the beſt conſtitutions are very liable to ſickneſs in moiſt cloſe places.

This reaſoning is liable to only one objection, that I know of, which is this: that the appearances we have mentioned, cannot be owing to the cauſes now aſſigned; ſince by calculation from them, the mercury muſt at new and full Moon ſubſide in the barometer to a certain degree; which yet barometrical writers do not obſerve to happen. Ramazzini in particular expreſſes his ſurprize on this head, thinking it reaſonable to ſuppoſe, that as the tides in the ocean are obſerved to be greater at thoſe times, than at any other time of the Moon, on account of the influence, which this planet is thought to have on the ſea; ſo likewiſe ſome remarkable change ought to appear in the gravity of the atmoſphere. But yet, ſays he, nothing of this kind has happened, worth mentioning; for through the whole courſe of this year there was little or no difference in the height of the mercury at the new and full Moons, with reſpect to the preceding and ſubſequent days; nor indeed during all the times of its darkneſs[g].

In anſwer to which, it may not be amiſs to enquire into the cauſe of the riſe and fall of the quickſilver in the barometer, which does not ſeem to have been cleared up by writers on this ſubject. Firſt then, it is certain, that this heavy fluid is raiſed by the preſſure of the incumbent air, and that the preſſure of this element is in proportion to its gravity: which as it is the greater, the more air is contained in the column directly impending on the quickſilver; whatſoever increaſes or diminiſhes this quantity of air will make the quickſilver riſe or fall in the tube. Hence it is, that winds occaſion very conſiderable changes in the weather-glaſs; according as they rarefy or condenſe the air in this column. Thus between the tropics, where the trade-winds reign, which are moderate gales, conſtantly blowing from the ſame quarter for ſeveral months together, the variations of the barometer are very inconſiderable, as Dr. Halley has obſerved[h]; whereas in northern latitudes they are conſiderable, and indeed more ſo than in ſouthern latitudes: becauſe ſtorms are more common in the former, than in the latter; and at thoſe times, which are moſt ſubject to winds, the mercury varies almoſt every hour: as Ramazzini has obſerved about the equinoxes. For about theſe, he ſays, I have obſerved remarkable variations, and eſpecially at the autumnal equinox, when the quickſilver roſe and fell ſeveral lines in one day; whereas in the ſolſtices it kept the ſame ſtation as in the foregoing days[i]. But yet, let the air be raiſed ever ſo high at the new and full Moon, it cannot poſſibly happen, that the mercury ſhould conſtantly ſubſide in all places at thoſe times: becauſe ſuch is the known property of winds, that thoſe, which carry off and rarefy the air in one place, crowd it in, and condenſe it in another.

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[g] Ephemerid. baromet. Mutinens. ann. 1694. p. 19.

[h] Phil. Tranſ. N°. 181. p. 111.

This matter thus far explained, it will not be improper to ſubjoin the ſolution of a difficult queſtion, which has raiſed great contention among philoſophers: viz. whereas water is more than eight hundred times heavier than air, how does it happen, that the latter, when replete with watery vapours, depreſſes the mercury in the barometer; ſo that its fall is an indication of rain? Now this phænomenon ſeems to me to be chiefly owing to the following cauſes. Water is ſo entirely void of elaſticity, that no force can compreſs it into a narrower compaſs; and at the ſame time, a boiling heat divides it into ſuch minute particles, as to make it occupy fourteen thouſand times more ſpace, than it naturally takes up[k]. This vapour, more than ſixteen times thinner than our air, is ſo ſubtile, that it is eaſily retained by the particles of the air, and unites with them, much in the ſame manner, as the very ſmall parts of metals, diſſolved in ſome acid liquors, are ſuſpended by them. For it is well known, that the more minutely bodies are divided, the more ſurface they acquire in reſpect to their bulk. Beſides, the air, which we breathe, contains a vaſt number of particles heavier than water, I mean the exhalations from minerals, animals, and vegetables, and in a word from all the productions of the earth. But perhaps what is of greateſt moment in this caſe, is the quality of the particles exhaled from the earth, which are chiefly ſulphureous. For it has been found by experiments, that the fumes from ſulphur are ſo contrary to elaſticity, that they quite deſtroy it[l]. Now, Sir Iſaac Newton has ſhewn, that almoſt all bodies contain ſulphur: and the phænomena of lightning and thunder ſhew, that the atmoſphere is full of it. Wherefore theſe reaſons ſufficiently prove, that moiſt air has leſs power to act than dry air. When theſe very ſubtile watery vapours, by their attractive and repulſive qualities, have run into one another, and formed drops; they thereby become heavier than air, and fall to the earth in the form of rain: and then the air, freed from theſe vapours, acts with greater force, and raiſes the mercury in the barometer.

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[i] Lib. citat. p. 20.

[k] See Deſagulier's Courſe of experimental Philoſophy, vol. ii. lect. x.

[l] See Hales's Statical Eſſays, vol. i. p. 230. and 299.

But to return; the winds are produced by ſo many different cauſes, that a perſon would find himſelf greatly miſtaken, who would attempt to account for them all upon any one principle.

Wherefore to thoſe already explained, we may add that conſtant cauſe of the motion of the air, I mean the heat of the Sun. For as Dr. Halley[m] has demonſtrated, that the trade-winds, which reign between the tropics, owe their riſe to it; ſo it is moſt certain, that it may occaſion various motions of the air in every part of the terraqueous globe. Moreover, we know that there ſometimes happen violent tempeſts in the upper regions of the air, while we enjoy a calm below; and that the ridges of mountains check the propagation of the winds in many places; ſo that it is no wonder, that the phænomena of the changes of the air, which we have aſcribed to the action of the Moon, are not always conſtant and uniform. Now the chief cauſes of uncertain and irregular winds are theſe. Firſt, elaſtic vapours forced from the bowels of the earth, by ſubterraneous heats, and condenſed by what cauſe ſoever in the atmoſphere. Secondly, a mixture of effluvia of different qualities in the air, may, by rarefactions and fermentations, produce winds, and other effects, like thoſe reſulting from the combination of ſome chemical liquors. And that ſuch things happen, we are aſſured from the nature of thunder, lightning, and meteors. Thirdly, from the eruptions of volcano's, and earthquakes in diſtant places, winds may be propagated to remoter countries. Laſtly, the divided or united forces of the other planets, and of comets, may variouſly diſturb the action of the Sun and Moon.

Theſe things being premiſed, it will not be difficult to ſhew, that theſe changes in our atmoſphere at high water, new and full moon, the equinoxes, &c. muſt occaſion ſome alterations in all animal bodies; and that from the following conſiderations.

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[m] Phil. Tranſ. N°. 183.

Firſt, all living creatures require air of a determined gravity, to perform reſpiration eaſily, and with advantage: for it is by its weight chiefly, that this fluid inſinuates itſelf into the lungs. Now the gravity, as we have proved, being leſſened at theſe ſeaſons, a ſmaller quantity than uſual will inſinuate itſelf; and this muſt be of ſmaller force to comminute the blood, and forward its paſſage into the left ventricle of the heart: whence a ſlower circulation enſues, and the ſecretion of the nervous fluid is diminiſhed.

Secondly, this effect will be the more ſure, in that the elaſticity of the atmoſphere is likewiſe diminiſhed. Air proper for reſpiration muſt be, not only heavy, but alſo elaſtic, to a certain degree: for as this is by its weight forced into the cavity of the thorax in inſpiration, ſo the muſcles of the thorax and abdomen preſs it into the moſt minute ramifications of the bronchia in expiration, where the bending force being ſomewhat taken off, and ſpringy bodies, when unbended, exerting their power every way, in proportion to their preſſures; the parts of the Air puſh againſt all the ſides of the veſiculæ, and promote the paſſage of the blood. Therefore the ſame things, which cauſe any alterations in this property of the air, will more or leſs diſturb the animal motions. We have a convincing inſtance of all this, in thoſe who go to the top of high mountains: for the Air is there ſo pure (as they call it) that is, thin, and wants ſo much of its gravity and elaſticity, that they cannot take in a ſufficient quantity of it to inflate the lungs, and therefore breathe with very great difficulty.

Laſtly, all the fluids in animals have in them a mixture of elaſtic aura, which, when ſet at liberty, ſhews its energy, and cauſes thoſe inteſtine motions, we obſerve in the blood and ſpirits; the exceſs of which is checked by the external ambient air, while thoſe juices are contained in their proper veſſels. Now when the preſſure of the atmoſphere upon the ſurface of our body is diminiſhed, the inward air in the veſſels muſt neceſſarily be enabled to exert its force, in proportion to the leſſening of the gravity and elaſticity of the outward: hereupon the juices begin to ferment, change the union and coheſion of their parts, and ſtretch the veſſels to ſuch a degree, as ſometimes to burſt the ſmalleſt of them. This is very plain in living creatures put into the receiver, exhauſted by the air-pump; which always firſt pant for breath, and then ſwell, as the air is more and more drawn out: their lungs at the ſame time contracting themſelves, and falling ſo together, as to be hardly diſcernible, eſpecially in the leſſer animals [n].

Concerning the weight of the atmoſphere on a Human Body, and its difference of preſſure at different times, let this eſtimate ſuffice. We will lay it down as certain, that this weight and preſſure may be computed from the force, with which the air raiſes the quickſilver in the barometer. The ſurface of a man's body, of a middle ſize, is fifteen ſquare feet, or 2160 inches. The weight of a cubic inch of quickſilver is 8,101, &c. ounces averdupois. Wherefore the preſſure of the air on every ſquare inch of the Human Body, in the ratio of the weight of the quickſilver in the barometer, will ſtand thus. A column of quickſilver, an inch ſquare, can in England be raiſed in the barometer to 30 inches and $\frac{8}{10}$, by the air when heavieſt; and it will ſubſide to 28 inches, when the air is lighteſt. Conſequently, the air, when heavieſt, will preſs on every inch of the ſurface of the Human Body, with the weight of 15 pounds and 9 ounces; when lighteſt, with that of 14 pounds 2 ounces averdupois. Thus the whole Body, in the heavieſt air, ſuſtains a weight of about 33684 pounds; in the lighteſt, of 30622 pounds 5 ounces. Whence the difference of preſſure at different times is 3062 pounds nearly. True it is, that the internal air of the Human Body makes a reſiſtance to that weight: but yet ſuch change of preſſure muſt neceſſarily have conſiderable effects; eſpecially when this internal air, through ſome defect in the animal fluids, with which it is mixed, is increaſed or diminiſhed in its natural properties.

Before we proceed to other matters, it may be worth the while to take notice of two things: firſt, that effects depending on ſuch cauſes as theſe, muſt of neceſſity be moſt viſible in weak bodies, and morbid conſtitutions, when other circumſtances concur to their taking place; while ſtrong bodies and ſound conſtitutions are little affected by them. For this reaſon, whatever miſchiefs do hence follow, cannot in the leaſt diſparage the wiſe contrivance of infinite power, in ordering theſe tides of our atmoſpere. The author of nature has certainly made all things to the greateſt advantage, that could be, for the whole ſyſtem of animals on our globe, although ſuch a diſpoſition might in ſome caſes prove prejudicial to a few. The poſition and diſtance of the Sun are ſo adjuſted, as to give, in the moſt beneficial manner poſſible, heat and light to the earth: yet this notwithſtanding, the exceſſive ſummer heats in ſome countries may be attended with bad conſequences; in others, the winter colds may be ſo intenſe, that tender bodies cannot bear them; and in all ſeaſons and climates, changes of weather may give birth to diſeaſes. The whole, however, we muſt own, is moſt carefully provided for. Beſides, as moſt of theſe laſt mentioned inconveniencies are by eaſy ſhifts to be avoided; ſo there are ſuch powerful checks put to this ærial flux and reflux, ſo many ways of abating the damages accruing from it now and then; that theſe are of no account, in compariſon of the mighty benefits hence ariſing, in which the race of mankind does univerſally ſhare.

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[n] Eſperienze dell' accademia del cimento, p. 118.

Secondly, that the other planets have likewiſe their peculiar influences; which, though inferior to thoſe of the Sun and Moon, yet contribute various ways towards increaſing or diminiſhing the action of theſe on Human Bodies. And theſe united forces are of ſuch conſequence, that violent and occult diſeaſes, with which whole nations are ſeized, may be certainly attributed to them. And the ϑεῖον τι or ſomewhat divine of Hippocrates[o], which he recommends to have regard to in diſeaſes, is moſt probably nothing more than the ſtate of our atmoſphere, occaſioned by the influence of the planets, or ſome other uncommon and unknown natural cauſe; as I have more amply explained on another occaſion[p].

CHAP. II.

Of the diſeaſes, and ſymptoms, which derive their origin from the abovementioned cauſes.

I NOW proceed to examine what particular functions of animal bodies are diſturbed by theſe periodical rarefactions of the fluids in their proper veſſels: and here I ſhall not ground my opinion on my own obſervation alone, but likewiſe take in the aſſiſtance of other medical writers. For there are no hiſtories in phyſic, which we may more ſafely take upon the credit of the authors, who relate them, than ſuch as we are now going to mention. In ſome caſes a point may perhaps be ſtrained, to ſerve a darling hypotheſis, which the writer has taken up; but here we are much more likely to have pure matter of fact: becauſe hitherto no one has pretended, that the appearances of this kind are within the reach of any ſcheme of philoſophy.

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[o] Prognoſtic. 1.

[p] See Account of Poiſons, eſſay vi.

And firſt it appears evident to me, that the Moon's influence is neceſſarily greater on the nervous fluid or animal ſpirits, than on the blood, or any other fluid of the animal body. For as that fluid is compoſed of extremely minute, and (as I have ſhewn elſewhere [q]) elaſtick parts; it muſt be the more eaſily ſuſceptible of the power of any external cauſe whatever. Wherefore the Moon's action will chiefly regard thoſe diſeaſes, which are occaſioned by the vitiation of thoſe ſpirits.

Of this claſs none ſeem more remarkable than epileptick diſeaſes, which, beſides the other difficulties, with which they are attended, have this alſo ſurprizing, that in ſome the fits do conſtantly return every new and full Moon. The Moon, ſays Galen [r], governs the periods of epileptick caſes. Upon this ſcore, they, who were thus affected, were by the Greek writer ſometimes called Σεληνιακοὶ [s], and in the hiſtories of the goſpel Σεληνιαζόμενοι [t], and by ſome of the Latins afterwards, Lunatici [u].

And indeed, I myſelf remember, when I was phyſician to St. Thomas's hoſpital during the time of queen Anne's wars with France, that ſeveral of the ſailors of our fleets were brought thither, and put under my care for this diſtemper: moſt of whom were new men, who had contracted the diſeaſe by frights, either in ſea-engagements, or in ſtorms. But the Moon's influence was ſo viſible on the generality of them at the new and full, that I have often predicted the times of the fits with tolerable certainty. And T. Bartholin tells a ſtory of an epileptick girl, who had ſpots in her face, which varied both in colour and magnitude, according to the time of the Moon. So great, ſays he, is the correſpondence between our bodies and the heavens [x].

Moreover, the learned Dr. Pitcairne has aſſured me, that he attended a patient of thirty years of age, of a thin habit and ſomewhat melancholick conſtitution of body; who, nine years before, after a conſiderable hemorrhage from the noſe, complained of ſome humour ſuddenly ariſing from his right hand to the top of his ſhoulder, and then fell ſenſeleſs on the ground. Upon his recovery from the fit, he felt ſo great a numbneſs in that hand, that he could not ſtir his fingers: and his right arm was violently toſſed forward and backward, againſt his will, for the ſpace of four minutes; during which time he loſt the uſe of his tongue. And this diſorder returned periodically twice every year, in March and September, that is, at the new Moon, near the vernal and autumnal equinoxes. The moſt remarkable particulars of this caſe were theſe. Firſt, the paroxyſm came on more frequently in the night, than in the day-time. Secondly, neither his feet, nor left arm, were ever affected by the diſorder. Thirdly, the ſtupor, which conſtantly remained ſince the firſt ſeizure of the diſorder, did never after deprive him of his ſenſes: for he could walk or ride, even when it was at the worſt. Fourthly, while the humour was moving up his hand, he could ſtill uſe his fingers: but when it had got up to the arm, then were they deprived of feeling and motion: afterwards, upon its ſeizing the right ſide of the head, it occaſioned violent convulſive motions of the arm for three or four minutes. Fifthly, at thoſe times when the fit was wont to return, he was ſometimes ſeized with the numbneſs twice or thrice in an hour; at other times not above once in two or three days. Sixthly, the diſeaſe was augmented by warm bathing: for after it, the paroxyſms were more violent than uſual. Laſtly, his memory was remarkably affected about the time of the paroxyſm.

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[q] See Introduction to a mechanical account of Poiſons.

[r] De diebus criticis, lib. iii.

[s] Alexand. Trallian. lib. i. c. 25.

[t] Matth. c. xvii. ℣. 15

[u] Apuleius de virtutibus herbar. cap. ix. & lxv.

[x] Hiſtor. anatom. centur. ii. hiſt. 72.

The ſame gentleman informed me likewiſe, that he knew ſeveral women, who were ſubject to epileptick ſymptoms at the new and full Moon; eſpecially pregnant women, and thoſe who ſtopped childing early, and whoſe menſtrual purgations left them before the uſual time. Theſe were frequently ſeized by the fit, in their ſleep, and ſometimes in the day-time alſo. And he remembered to have cured two young women, whoſe fits followed the change of the Moon; but they were of that kind of epileptick fits, which are commonly called St. Vitus's dance. Their geſtures were very odd and incertain, and ſomewhat like dancing: and they were deprived of ſpeech, during the paroxyſm. In fine, other phyſicians had tried in vain to cure theſe diſorders by Sydenham's method [x], for want of attending to their monthly periodical returns.

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[x] In Schedula monotoria.

But no greater conſent in ſuch caſes was perhaps ever obſerved, than what I ſaw many years ſince in a child about five years old; in which the convulſions were ſo ſtrong and frequent, that life was almoſt deſpaired of, and by evacuations and other medicines very difficultly ſaved. The girl, who was of a luſty full habit of body, continued well for a few days; but was at full Moon again ſeized with a moſt violent fit: after which, the diſeaſe kept its periods conſtant and regular with the tides. She lay always ſpeechleſs during the whole time of flood, and recovered upon the ebb. The father, who lived by the Thames ſide, and did buſineſs upon the river, obſerved theſe returns to be ſo punctual; that not only coming home, he knew how the child was before he ſaw it, but in the night has riſen to his employ; being warned by her cries, when coming out of the fit, of the turning of the water. This continued fourteen days, that is, to the next great change of the Moon; and then a dry ſcab on the crown of the head, (the effect of an epiſpaſtick plaiſter, with which I had covered the whole occiput in the beginning of the illneſs) broke; and from the ſore, though there had been no ſenſible diſcharge this way for above a fortnight, ran a conſiperable quantity of limpid ſerum. Upon which, the fits returning no more, I took great care to promote this new evacuation by proper applications, with deſired ſucceſs, for ſome time; and when it ceaſed, beſides three or four purges with mercurius dulcis, &c. directed to be taken about the new and full of the Moon, I ordered an iſſue in the neck, which being thought troubleſome, was made in the arm. The patient however grew up to woman's eſtate, without ever after feeling any attacks of thoſe frightful ſymptoms.

Whether or no it be through want of due heed and inquiry, that we have not, in all the collections of hiſtories and caſes, any inſtance of the like nature ſo particular as this is, I will not take upon me to aſſert: but to me it ſeems probable, that when due attention ſhall be given to theſe cauſes, various examples will occur of the ſame kind of ſympathy. In the mean time I cannot think it ſtrange, that ſome of the Antients, as Aretæus has recorded [y], attributed this diſeaſe entirely to the Moon; and were of opinion, that the deity of that planet inflicted this kind of puniſhment on wicked people for their crimes, and therefore called it the ſacred diſeaſe.

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[y] De diuturnis morbis, lib. i. c. 4.

And it may not be improper to remark in this place, that the raving fits of mad people, which keep lunar periods, are generally accompanied with epileptick ſymptoms: which was atteſted to me as a conſtant obſervation by the late learned Dr. Tyſon, formerly phyſician to Bethlehem hoſpital, who upon that account uſually called ſuch patients epileptick mad.

The vertigo is nearly related to the epilepſy according to Galen [z], and therefore it was by the antients called the little epilepſy, as Cælius Aurelianus relates [a]. This at leaſt is certain, that both theſe diſeaſes are frequently obſerved to obey the lunar influence: which is confirmed by ſeveral caſes, that fell under the obſervation of Dr. Pitcairne.

Hyſterical diſorders do likewiſe partake of the ſame nature; and therefore a juſt regard to thoſe periods will contribute to happier ſucceſs in the cure. One of Pitcairne's caſes is that of a young married woman, of a fat habit of body, and red-haired, who never had her monthly evacuations in a proper quantity. She had for four years paſt complained of a troubleſome weight or preſſure on the crown of the head, and of a cold humour at the ſame time trickling down to her ſhoulders, with great giddineſs and choaking: ſhe alſo threw up a ſharp ſlimy humour from off her ſtomach, had a pain and ſqueezing about her heart, with a difficulty of breathing in the morning at upriſing; and theſe ſymptoms returned conſtantly every new and full Moon.

Carolus Piſo, an accurate writer of medical obſervations, relates two caſes to this purpoſe; the firſt of a lady of quality, whoſe left cheek and part of the neck were wont to ſwell very ſenſibly, about the new Moon; and this ſymptom was conſtantly attended with an hyſterical ſuffocation [b]. The ſecond was of a girl, who, about each full Moon of the ſpring ſeaſon, was ſeized with ſuch obſtinate hyſterical ſymptoms, that they continued the whole third quarter. The firſt day ſhe was convulſed, then ſhe was ſeized with a loſs of ſpeech, and fell into a deep ſleep, which laſted two days: and the remaining four days ſhe ſpent in doing inſignificant things, crying out for help, or in ſhort in a ſlight delirium, without a wink of ſleep [c].

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[z] In aphor. Hippoc comment. iii. aph. 17.

[a] De morb. chron. lib. i. cap. 2.

[b] De morbis a ſeroſa colluvie, Obſ. 27.

[c] Obſ. 28.

Phyſicians have recorded ſeveral remarkable inſtances of periodical palſies. The ſame Piſo gives the following. An aged man was ſeized with a ſleepineſs and great laſſitude, which was followed by a dead palſey, ſtupor, loſs of memory, and ſome degree of folly, with a fever. Theſe complaints returned regularly every new Moon for two years; the ſymptoms gradually leſſening, and the laſt fits had but a faint reſemblance with thoſe, he ſuffered in the beginning[d].

Tulpius, a very candid and judicious writer, relates a ſingular caſe of a ſhaking palſey, with which a maiden of a pale complexion, and phlegmatick habit of body, was afflicted during the ſpace of three years, not conſtantly indeed, but with intermiſſions; each fit laſting near two hours, accompanied with a hoarſeneſs and ſuppreſſion of voice. The paroxyſms manifeſtly agreed, ſometimes with the Tides, ſometimes with the Moon, and ſometimes with the Sun: for according to the change of theſe, the returns were ſometimes earlier, ſometimes later[e].

The antients obſerved, and every one knows, how great a ſhare the Moon has in forwarding thoſe evacuations of the weaker ſex, which have their name from the conſtant regularity they keep in their returns. And there is no queſtion to be made, but the correſpondency, which we here obſerve, would be greater ſtill, and even univerſal; did not the infinite varieties in particular conſtitutions, climates, manner of life, and many accidents, one way or other concur to make a difference. It is very obſervable, that in countries neareſt to the equator, where we have proved the lunar action to be ſtrongeſt, theſe monthly ſecretions are in much greater quantity, than in thoſe near the poles, where this force is weakeſt. This Hippocrates[f] takes notice of, with reſpect to places far north, and gives it as one reaſon, why the women in Scythia are not very fruitful.

The caſe being thus with females, it is no wonder, if we ſometimes meet with periodical hemorrhages anſwering to the times of the Moon in males alſo. For as a greater quantity of blood, in proportion to the bulk in one ſex, is the reaſon of its diſcharging itſelf through proper ducts, at certain intervals, when the preſſure of the external air being diminiſhed, the internal aura can exert its elaſticity; ſo in the other, if at any time there happens to be a ſuperabundancy of the ſame fluid, together with a weak tone of the fibres; it is plain that the veſſels will be moſt eaſily burſt, when the reſiſtance of the atmoſphere is leaſt. And this more eſpecially, if any accidental hurt, or rarefying force has firſt given occaſion to the other cauſes to take effect.

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[d] Obſ. 16.

[e] Obſerv. med. lib. i. cap. 12.

[f] De aëre, aquis, & locis.

I have known a young gentleman of a tender frame of body, but otherwiſe healthy, who having once, by overreaching, ſtrained the parts about the breaſt, fell thereupon into a ſpitting of blood; which for a year and half conſtantly returned every new Moon, and decreaſing gradually, continued always four or five days: the fits being more or leſs conſiderable, according as his management about that time contributed to a greater or leſſer fulneſs of the veſſels.

Doctor Pitcairne's own caſe is remarkable, both in regard to the diſeaſe and its concomitant circumſtances. In the year 1687, being at a country-ſeat near Edinburgh in February, on a fairer day than uſual at that ſeaſon, and the Sun looking reddiſh; he was ſeized, at nine in the morning, the very hour of the new Moon, with a ſudden bleeding at the noſe, after an uncommon faintneſs. And the next day, on his return to town, he found that the barometer was lower at that very hour, than either he, or his friend Dr. Gregory, who kept the journal of the weather, had ever obſerved it: and that another friend of his, Mr. Cockburn, profeſſor of philoſophy, had died ſuddenly at the ſame hour by an eruption of blood from the lungs; and alſo five or ſix others of his patients were ſeized with different hemorrhages.

We have two notable inſtances of the like nature in our Philoſophical Tranſactions; the one related by Dr. Muſgrave[g] of a perſon, who, from his infancy to the twenty-fourth year of his age, had every full Moon an eruption of blood on the right ſide of the nail of his left thumb; at firſt to three or four ounces, and after his ſixteenth year, to half a pound each time; which when, by ſearing the part with a hot iron, it ſtopped, he fell into a ſpitting of blood, and by frequent bleeding, &c. was very difficultly ſaved from a conſumption. The other[h] is a ſtory of an inn-keeper in Ireland, who from the forty-third year of his life, to the fifty fifth (in which it killed him) ſuffered a periodical evacuation at the point of the fore-finger of his right-hand; and whenever they endeavoured to ſtanch the blood, it raiſed moſt exquiſite tortures in his arm. And although the fits here kept not their returns ſo certain as in the forementioned caſe, (it may be either from the irregular way of living of the patient, or the mighty change every effuſion made in his habit of body, the quantity ſeldom amounting to leſs than four pounds at a time) yet there is this remarkable circumſtance in the relation, that the firſt appearance of this hemorrhage was at Eaſter, that is, the next full Moon after the vernal equinox: which is one of the two ſeaſons of the year, at which we have proved the attraction of the air, or diminution of its preſſure, to be greater than at any other time whatſoever.

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[g] N°. 272.

[h] N°. 171.

But we are beſides this to conſider, that the ſtatick chair, and nice obſervation taught Sanctorious[i], that men do increaſe a pound or two in their weight every month, which overplus is diſcharged at the month's end, by a criſis of copious, or thick turbid urine. It is not therefore at all ſtrange, that we ſhould once a month be liable to the returns of ſuch diſtempers, as depend upon a fulneſs of the veſſels; that theſe ſhould take place at thoſe times eſpecially, when the ambient air is leaſt able to repreſs the turgency; and that though new and full Moon are both of equal force, yet that ſometimes one, and ſometimes the other only ſhould influence the periods, according as this or that happens to fall in with the inward repletion.

The fluor albus is a diſeaſe equally common and difficult of cure. Of this diſeaſe Dr. Pitcairne has obſerved a caſe, which laſted four years: wherein the returns came regularly at every new Moon, and the diſcharge conſtantly laſted eight days.

Ulcers are liable to various accidents, which render ſome of them of incertain prognoſtick: and yet even in theſe the afflux of humours is ſometimes manifeſtly altered by this power. Baglivi[k] was acquainted with a learned young man at Rome, who laboured under a fiſtula in the abdomen, penetrating to the colon; which diſcharged ſo plentifully in the increaſe, and ſo ſparingly in the decreaſe of the Moon, that he could make a very true judgment of the periods and quadratures of that planet, from the different quantity of the matter that came from him. This reminds me of the caſe of a young man, who after impure coition firſt felt a pain in his back, and a weakneſs and liſtleſſneſs to walk in his thighs for four days. After this, appeared an ulcer in the glans penis, which ran with fetid matter. This flux ſtopped ſpontaneouſly in about a week; but returned next new Moon,

[i] Medic. ſtatic. ſect. 1. aph. 65.

[k] De experiment. circa ſanguin. Operum pag. 449.

and continued ſo to ſtop and return for ſome months; till he was put into a proper courſe of medicine, whereby he was perfectly cured.

Nephritick paroxyſms have frequently been obſerved to obey the lunar attraction. Tulpius[l] relates the caſe of Mr. Henry Ainſworth, an Engliſh miniſter at Amſterdam, who had a fit of the gravel and ſuppreſſion of urine every full Moon; of which he found no relief till the Moon decreaſed, unleſs by bleeding at the arm. After his death two large ſtones were taken out of his bladder, and the pelvis of the left kidney was enlarged to that degree by the quantity of urine ſo often ſtopped there, as to contain almoſt as much as the bladder itſelf. He likewiſe ſaw a caſe of a capillorum mictus, which returned periodically every fortnight, with great difficulty of urine, and ſuch uneaſineſs in the patient's body, that he could ſcarcely keep in bed[m].

There is a fact almoſt contrary to theſe related by T. Bartholin; who being called to a conſultation on the caſe of M. Bullichius, the chief magiſtrate of Copenhagen, found that for ſome years paſt he had been afflicted with a periodical diabetes ſpuria, which returned every month with pain after a ſevere nephritick fit, at or near the full Moon; when he made twelve quarts or twenty-four pounds of water, though he had not drank a pint[n].

I was preſent, many years ſince, at the diſſection of a child about five years old, who died of the frequent returns of nephritick fits, attended with vomitings and a diarrhœa. The kidneys and ureters were quite ſtuffed with a ſlimy calculous matter, and it was very inſtructive to ſee the different degrees of concretion in the ſeveral parts of it, from a clear limpid water to a milky liquor, which ſhot into branchy cryſtals, and theſe coaleſcing became a hard friable ſubſtance. Dr. Groenvelt, who had attended the boy in his illneſs, obſerved him to be ſeized with his pains at every full Moon for ſeveral months together, which generally ended with the voiding of a ſmall ſtone or two.

To theſe nephritick caſes I ſhall add one more, which fell under my own notice. A young lady, fourteen years of age, of a good complexion, was from her infancy afflicted with this odd diſorder. A day or two before the full Moon ſhe waxed pale, weak, dejected and melancholy; and then unwittingly diſcharged a large quantity of urine in her ſleep. And this diſcharge continued five or ſix nights together: after which it ceaſed, and then her colour and chearful temper returned. The beſt ſtrengthening medicines were of no avail, until proper evacuations were thought of and made two or three days before the return of the paroxyſm: which prevented the lunar influence.

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[l] Obſerv. lib. ii. c. 43. [m] Ibid. cap. 52. [n] Acta medic. & philoſ. Hafniens, vol. i. Obſ. 5.

That the fits of the aſthma are frequently periodical, and under the influence of the Moon, and alſo of the weather, Van Helmont takes notice from his own experience [o]. And Sir John Floyer, who has given us a more particular hiſtory of this diſeaſe than any other author, obſerves, that the fits uſually return once in a fortnight, and frequently happen near the change of the Moon [p].

A more uncommon effect of this attractive power is related by the learned Kirckringius. He knew a young gentlewoman, whoſe beauty depended upon the lunar force, inſomuch that at full Moon ſhe was plump and very handſome; but in the decreaſe of the planet ſo wan and ill-favoured, that ſhe was aſhamed to go abroad; till the return of the new Moon gradually gave fulneſs to her face, and attraction to her charms [q]. If this ſeems ſtrange, it is indeed no more than an influence of the ſame kind with that, which the Moon has always been obſerved to have upon ſhell-fiſh, and ſome other living creatures. For as the old Latin poet Lucilius ſays:

Luna alit oſtrea, & implet echinos, muribu' fibras
Et pecui addit ——— [r]

And after him Manilius:

Si ſubmerſa fretis, concharum & carcere clauſa,
Ad lunæ motum variant animalia corpus [s].

The knowledge of criſes in acute diſeaſes is attended with great difficulties: wherefore it may be very well worth the pains to inquire, what ſhare ſuch an alteration in the weight and preſſure of the atmoſphere may have in them. The antients made great account of critical days, and regulated their practice in fevers according to the expectation they had from them. This part of phyſick is grown now into diſuſe, quite ſlighted, and even ridiculed; and that I ſuppoſe chiefly for theſe two reaſons. For in the firſt place, the earlieſt obſervations of this kind, which were drawn into rules, being made in hot eaſtern countries; when theſe came to be applied to the diſtempers of the colder northern regions, without allowance given for the difference of the climate, they were oftentimes found not to anſwer. And ſecondly, fevers of old were treated with few medicines, and chiefly managed by very ſlender diet: the motions of nature were carefully watched, and no violence offered to interrupt her work. The hiſtories therefore of criſes, though of great uſe and certainty under ſuch management as this, were at length unavoidably ſet aſide and loſt; when acute caſes came to be cured, according to this or that hypotheſis, not only by evacuations, but hot or cold alteratives too: there being no longer any room for thoſe laws of practice, which ſuppoſed a regular and uniform progreſs of the diſtemper.

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[o] Aſthma & Tuſſ. §. 22.
[p] Treatiſe of the aſthma, p. 17.
[q] Obſerv. anatomic. 92.
[r] Apud. A. Gellium, lib. xx. c. 8.
[s] Aſtronomic. lib. ii. ver. 93.

Wherefore, in order to underſtand a little, both what might induce the firſt maſters of our profeſſion to ſo nice and ſtrict an obſervance in this point; and what grounds there may be now, for a more due regard to their precepts, even upon the ſcore of the lunar attraction only; I propoſe a few remarks, after having premiſed ſome things proper to be known on this ſubject.

It is moſt certain, that epidemick fevers are cauſed by ſome noxious qualities of our atmoſphere; and therefore it ſeems reaſonable to ſuppoſe, that ſuch changes as produce thoſe effects may happen in it in all ſeaſons by the influence of the Moon. And this is confirmed by Ramazzini in his treatiſe of the epidemick conſtitution of the years 1692, 1693, and 1694, in the city and neighbourhood of Modena. During theſe three years a very contagious purple fever reigned. "And it was worthy of obſervation, ſays he, that the diſeaſe raged more violently after the full Moon, and eſpecially in the dark quarter; and abated upon the appearance of the new Moon: as not only I, but other phyſicians here, conſtantly obſerved; and this obſervation was of great ſervice both in the prognoſtick and cure [t]."

It is well known, that in ſolar eclipſes the Moon is in conjunction with the Sun, and in oppoſition in lunar eclipſes: wherefore there is nothing ſtrange in what this ſame author wonders at in theſe words. "What happened January 21, 1693, was very ſurprizing. For the Moon having been eclipſed that night, the greateſt part of the ſick died about the very hour of the eclipſe: and ſome were even ſtruck with ſudden death[u]." And the learned Ballonius relates a fact of the ſame nature, where he ſays, that ſome phyſicians having met on the caſe of a lady of quality; while they were actually in conſultation, a ſolar eclipſe was at hand. Wherefore, as they thought the patient in no eminent danger, they went out to view the eclipſe: but they were ſoon called back, upon the lady's fainting away, the very inſtant it began. And ſhe did not recover her ſenſes, till the eclipſe was quite over[w].

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[t] De conſtit. ann. 1692-3-4. Mutin. 1695. 4to, pag. 97.

If phyſicians had formerly been acquainted with what I have laid down on the Moon's influence, I make no doubt but a much greater number of facts of this kind would occur in the hiſtories of epidemick diſeaſes, than we find recorded at preſent. To thoſe already mentioned let me add one more, which is the more intereſting, upon account of the ſubject of it. It was our great genius and excellent philoſopher the lord high chancellor Bacon, viſcount St. Albans; who had this peculiarity in his conſtitution, that at every lunar eclipſe, he ſuddenly fell into a ſwoon; though he did not ſo much as think, or even know of the eclipſe; and did not recover, till it was ended[x].

And it is ſtill freſh in the memories of ſome, that in that memorable eclipſe of the Sun, which happened April 22, 1715, and in which the total obſcuration laſted here at London three minutes and twenty-three ſeconds, many ſick people found themſelves conſiderably worſe during the time: which circumſtance people generally wondered at, but I could eaſily account for. In the morning I went with Dr. Halley and other aſtronomers, to the obſervatory on the top of the Royal Society's houſe in Crane-Court, in order to view the eclipſe, and conſider the ſtate of the weather, and changes that might probably happen in our atmoſphere; and then the Sun was very bright, and the ſky remarkably ſerene. But when the eclipſe became total, the air was ſo uncommonly cold and moiſt, that it made us ſhiver; and the face of nature appeared ſo extremely gloomy and diſmal, that the birds fluttered about in wild affright, and the cattle in the fields ſtood fixed as ſtatues, through exceſs of aſtoniſhment. Whereas, no ſooner had the Sun begun to emerge, but every creature aſſumed ſo chearful an aſpect; that I never ſaw, nor indeed do I ever expect to ſee ſo pleaſing a ſight.

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[u] Ibid. pag. 98. [w] Epidem. lib. i. pag. 48. [x] See Rawley's life of the right honourable Francis Bacon, Lord Verulam, &c.

But to return to the ſubject of fevers; it is evident that thoſe changes of the air, which affect healthy bodies, muſt have a conſiderable effect on weak conſtitutions, and thoſe labouring under acute diſeaſes. To what has been already ſaid on this head, I ſhall here add, that the plague itſelf is liable to be affected by the Moon's action. For Diemerbroeck, who has given an accurate deſcription of the plague at Nimeguen in the year 1636, obſerved, that the contagion conſtantly increaſed about the new and full of the Moon; and that the greateſt part of thoſe, who were then ſeized, died [y]. Much more may be ſaid on this ſubject; but it appears too plain, to need further illuſtration: wherefore I return to the ſubject of criſes.

Firſt, all epidemick diſeaſes do in their regular courſe require a ſtated time, in which they come to their height, decline, and leave the body free. This is ſo conſtant and certain, that when a fever of any conſtitution, which is continual in one ſubject, happens, from ſome other cauſe, in another to be intermitting; the paroxyſms do always return ſo often, as altogether to make up juſt as many days of illneſs, as he ſuffers, whoſe diſtemper goes on from beginning to end, without any abatement. Dr. Sydenham, a ſworn enemy to all theories, learned thus much from downright obſervation; and gives this reaſon, why autumnal quartans hold ſix months: becauſe by computation the fits of ſo long a time amount to 336 hours, or 14 days, the period of a continual fever of the ſame ſeaſon [z]. So Galen takes notice, that an exquiſite tertian is terminated in ſeven paroxyſms; becauſe a true continual has its criſis in ſeven days: that is, the fever laſts as long in one, as in the other; in as much (ſays he) as a fit in an intermitting fever anſwers to a day in a continual [a]. Now this ſo comes to paſs, becauſe,

Secondly, in theſe caſes there is always a fermentation in the blood, which goes not off, till the active particles are thrown out by thoſe organs of ſecretion, which, according to the laws of motion, are moſt fitted to ſeparate them.

Thirdly, as different liquors, put upon a ferment, are depurated in different times; ſo the arterial fluid takes up a determined period, in which it is diſcharged of an induced efferveſcence.

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[y] De peſte, pag. 9.

[z] Method. curandi febres. Lond. 1666, 8vo, pag 100.

[a] Comment. in aphor. Hipp. lib. iv. aph. 59. & de criſib. lib. ii. c. 6.

Fourthly, the ſymptoms, during this ebullition, do not proceed all along in the ſame tenour; but, on ſome days particularly, they give ſuch evident marks of their good or bad quality, that the nature of the enſuing ſolution may very well be gueſſed at, and foretold by them. Things being thus, thoſe days, on which the diſeaſe was ſo evidently terminated one way or other, were by the antients called the days of criſis; and thoſe, upon which the tendency of the illneſs was diſcovered by moſt viſible tokens, the indices of the critical days.

And thus far the foundation was good: but when a falſe theory happened unluckily to be joined to true obſervations, this did conſiderably puzzle the affair. Hippocrates, it is plain, knew not to what to aſcribe that remarkable regularity, with which he ſaw, that the periods of fevers were generally ended on the ſeventh, fourteenth, or one and twentieth day. The philoſophy of Pythagoras was in thoſe ages very famous, of which harmony and the myſteries of numbers made a conſiderable part; odd were accounted more powerful than even, and ſeven the moſt perfect of all. Our great phyſician eſpouſed theſe notions, and confined the ſtages of acute diſtempers to a ſeptenary progreſſion[b]: upon which this inconvenience followed, that when a criſis fell out on an even day, his meaſures were quite broken, and he apprehended a relapſe[c]; and if the fever did not terminate on the ſeventh, he waited for the fourteenth, and even for the twenty-firſt day.

But whereas the criſis of fevers were ſometimes obſerved to fall on the ſixth or eighth day of the diſeaſe, without any return; Aſclepiades rejected this whole doctrine as vain[d]: and Celſus, finding it to be too nice and ſcrupulous, obſerves, that the Pythagorean numbers led the antients into the error[e].

Galen, being aware of this, ſucceeded much better in his reaſoning upon the matter; and very happily imputed the critical changes, not to the power of numbers, but to the influence of the Moon; which he obſerves, has a mighty action upon our earth, exceeding the other planets, not in energy, but in nearneſs[f]. So that, according to him, the ſeptenary periods in acute diſeaſes are owing to the quarterly lunar phaſes, which are the times of the greateſt force, and which return in about ſeven days[g]. Hence it appears, that Galen hit upon the cauſe of the changes in the returns and periods of fevers; but did not ſo much as gueſs at the manner of its producing the effect.

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[b] De ſeptimeſtri partu. [c] Aphor. ſect. iv. 36. [d] Vid. Celſum, lib. iii. c. 4. [e] Ibid. [f] De diebus decretur. lib. iii. [g] Ibid.

The reſult of the whole affair in ſhort is this. A criſis is no more than the expulſion of the morbifick matter out of the body, through ſome or other of the ſecretory organs; in order to which, it is neceſſary that this ſhould be prepared and comminuted to ſuch a degree, as is required to make it paſs into the orifices of the reſpective glands. And therefore, as the moſt perfect criſis is by ſweat, (both by reaſon that the ſubcutaneous glands do naturally diſcharge more than all the others put together; and alſo that their ducts being the ſmalleſt of any, whatſoever comes this way is certainly very well divided and broken) ſo the moſt imperfect is a hemorrhage: becauſe this is an argument, that what offends is not fit to be caſt off in any part, and conſequently breaks the veſſels by the effervefcence of the blood. An abſceſs in thoſe organs, which ſeparate thick ſlimy juices, is of a middle nature betwixt theſe two.

Now it is very plain, that if the time, in which either the peccant humour is prepared for ſecretion, or the fermentation of the blood is come to its height, falls in with thoſe changes in the atmoſphere, which diminiſh its preſſure at the new and full Moon; the criſis will then be more complete and large: and alſo, that this work may be forwarded or delayed a day, upon the account of ſuch an alteration in the air; the diſtenſion of the veſſels, upon which it depends, being hereby made more eaſy, and a weak habit of body in ſome caſes ſtanding in need of this outward aſſiſtance. Thus a fever, which requires about a week to its period, may ſometimes have a good criſis on the ſixth, and ſometimes not till the eighth day, as Hippocrates has obſerved.

In order therefore to make true obſervations of this kind, the time of invaſion is to be conſidered; the genuine courſe of the diſtemper muſt next be watched, which is not to be interrupted by any violent methods; the ſtrength of nature in the patient is to be attended to, and by what ſecretions the criſis is moſt likely to be performed: and it will then be found, that not only the new and full Moons, but even the ſouthings, whether viſible or latent, of the planet, are here of conſiderable moment.

To conclude, this powerful action of the Moon is obſerved not only by philoſophers and natural hiſtorians, but even by the common people, who have been fully perſuaded of it time out of mind. Pliny relates, that Ariſtotle laid it down as an aphoriſm: that no animal dies but in the ebb of the tide[h]. And that births and deaths chiefly happen about the new and full Moon, is an axiom even among women. The huſbandmen likewiſe are regulated by the Moon in planting and managing trees, and ſeveral other of their occupations. So great is the empire of the Moon over the terraqueous globe.

CHAP. III.

Of the benefits accruing to the practice of phyſick from this theory.

IT is now time to enquire, what uſe may be made of theſe obſervations in practice. And firſt, they muſt be of ſervice in predicting the returns of the paroxyſms, and the iſſue of the diſeaſe; which will gain reputation to the phyſician, and give confidence to the patient. But I will endeavour to ſhew, that they will be of greater ſervice ſtill, in contributing towards the cure of diſeaſes. In order to which, I will firſt lay down ſome general remarks, and then deſcend to particulars.

It ſeems pretty evident, that all diſeaſes, whoſe returns anſwer to the changes of the Moon, ariſe from repletion. For as the Moon's action produces its effect by diſtending the veſſels only; it is manifeſt, that plenitude alone can increaſe this diſtenſion, whether it happen by the quantity of the fluids, or their efferveſcence. And therefore all diſeaſes, which return but once or twice in a month, and are increaſed by the Moon's influence, require evacuations: which muſt diminiſh at leaſt, if not cure the diſeaſe. But as regard is to be had to the nature of the diſtemper, and the time and manner of the evacuation; it is neceſſary to eſtabliſh ſome rules on each of theſe heads.

Firſt then, we are to conſider, whether the diſeaſe lies in the blood-veſſels, or in the vicious quality of the fluids ſeparated from the blood, and conveyed to ſome principal part of the body. In the firſt caſe, we ſhould lay the greateſt ſtreſs on phlebotomy; in the ſecond, on proper medicines for correcting the taint of the fluids. Beſides, as we know by experience, that evacuations are to be made by the way, which nature points out; great attention muſt be given to finding out that way in every particular diſeaſe. Then the beſt time for evacuating, is in both caſes a little before the paroxyſm or exacerbation: not only becauſe its violence is thereby obviated, but likewiſe becauſe the humours then turgid, will flow out of the body with more eaſe, and in greater plenty. And in order to make this matter better underſtood, I will add ſome few practical remarks on the diſeaſes mentioned in the foregoing chapter.

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[h] Hiſt. nat. lib. ii. cap. 98.

The epilepſy is extremely difficult to be cured in adults, but in children it is the reverſe. And that evacuations, eſpecially by a bliſter laid to the back part of the head, are of great uſe here, is plain from a caſe above related [i]; which not only confirms the aſſertion of Panarolus, who ſays, that he cured a boy of ſeven years of age, who had been ſpeechleſs, ſtupid, and epileptick, by a bliſter applied to the coronal ſuture [k]; but proves the goodneſs of Celſus's advice, to apply cupping glaſſes with ſcarification to the occiput; and beſides to apply the actual cautery in two places, one in the occiput, and the other lower down in the neck upon the firſt vertebra; in order to have a plentiful drain of the noxious humour [l]. For the head is the chief ſeat of diſeaſes of this kind: frequently occaſioned in children by plenitude, and the lentor of the blood, which has not been comminuted by bodily exerciſe, or the action of the lungs; and in adults by a redundancy of humours, falls, or ſudden frights. In this obſtinate diſeaſe the moſt proper medicines for correcting the juices, ſeem to be native cinnabar, and more eſpecially wild valerian root, before it has ſhot out its ſtalk; pulverized, and given frequently in a due quantity. For my part, I have ſeveral times found them both very ſucceſsful; and for the virtues of the laſt, I particularly recommend the reader to Panarolus [m], and the famous botaniſt Fabius Columna [n]. However it muſt not be forgot, that this diſeaſe owes its origin to ſo many different cauſes, and is bred in ſo many different conſtitutions of body; that the ſame remedy, which ſucceeds in one caſe, often fails in another: and therefore different medicines are to be tried, eſpecially on adults. And great regard muſt be had to the times, in which the paroxyſms moſt uſually return, in order to effect a cure.

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[i] Pag. 179.
[k] Obſ. med. pentecoſt. iv. Obſ. 30.
[l] Lib. iii. cap. 23.
[m] Obſ. med. pen. 1. Obſ. 33.
[n] Phytobas p. 120.

The vertigo is likewiſe cured by theſe ſame medicines. But the patient muſt be vomited now and then, and bliſtered on the head or neck. This is a diſeaſe of the eyes, and generally ariſes from too great tenſion of the extremities of the ſmall arteries, as Bellini has demonſtrated: wherefore it is no wonder, if it ſhould follow the changes of the Moon.

Hyſterical diſorders are cured much in the ſame manner. But they ſeldom require bleeding, and purging ſhould be uſed with caution. Emeticks are of greater ſervice, eſpecially a little before the fit. For in the fit the beſt medicines are thoſe, which repair the loſs of ſpirits, as gum ammoniack, Ruſſian caſtor, ſalt of amber, in pills, and the like. And in moſt of thoſe caſes, care muſt be taken to adapt the medicines to the uſual way of living of the patient, and to the affections of her mind.

The monthly returns of paralytick diſorders, which are ſometimes obſerved, are owing to the ſource of the diſeaſe, which is generally the head: in which the ſeroſities of the brain being extravaſated, attack the origin of thoſe nerves, where they happen to lodge, and cauſe a palſey of this or that part. Hence it is, that this diſeaſe is very often the conſequence of an apoplexy, under the ſhape of a general palſey, or that of one ſide only. But when this diſorder is occaſioned by an external injury done to the nerves, or by internal tumours, then it obſerves no regular periods. The cure is to be begun by evacuating the redundant phlegm, which in moſt caſes is beſt done by ſtool; and then an eye muſt be had to the return of the diſtemper, not only by putting the patient into a courſe of attenuating medicines, as the horſe-radiſh root, wild valerian root, muſtard-ſeed, and ſuch like; but alſo of cold bathing, if his age and ſtrength will allow it: for this remedy is not ſo beneficial for old folks, as for young; but as it braces up the relaxed fibres, and promotes urine, it is proper for this diſeaſe in both theſe reſpects. For this reaſon the antients, according to Cælius Aurelianus [o], ordered their paralytick patients to ſwim in the ſea, or to undergo the cataractical courſe, by the fall of water from on high on the weak parts; on account of the greater weight of ſalt than freſh water, and the more intenſe cold of falling than ſtill water.

St. Vitus's dance is generally called a convulſive diſorder; but I look on it to be rather paralytick, and to take its riſe from a relaxation of the muſcles, which being unable to perform

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[o] De morb. chronic. lib. ii. cap. 1.

form their functions in moving the limbs, ſhake them irregularly by jirks. And it is for the moſt part but a ſlight evil, and commonly ſeizes weak habits of body; girls more frequently than boys, and ſeldom adults. Wherefore I never found it difficult to be cured by the cold bath and chalybeate medicines.

The diſorders of the monthly evacuations of the fair ſex require our ſerious conſideration. As the exceſs of them generally proceeds from an acrimony in the blood, ſo the defect is chiefly owing to a lentor. For this flux is ſeldom ſuppreſſed for want of a ſufficient quantity of blood: ſuch wonderful art has the all-wiſe author of nature employed in making full proviſion for an evacuation, equally requiſite for the health of the individual, and the propagation of human kind. Wherefore, as in immoderate diſcharges, regard ſhould be had to the times, when the effervеſcent humour can the more eaſily burſt through its veſſels, according to the doctrine already laid down; in order to make a revulſion at thoſe times, by drawing blood from parts the moſt diſtant from the ſeat of the diſtemper: ſo when a ſuppreſſion of the menſes requires blood-letting, Vander Linden's caution is to be obſerved, which is recommended by Etmuller [p], and rationally accounted for by Dr. Freind [q]. Moreover, as the Peruvian bark is very powerful in allaying the effervеſcence of the blood, whereby the veſſels are diſtended; it will be very proper to give it plentifully ſome few days before the time that too great a diſcharge is apprehended.

The ſame method is to be obſerved in all periodical hemorrhages, giving thoſe medicines at the ſame time, which reſtringe and brace up the fibres: of which the beſt are burnt alum, with a fourth part of ſanguis draconis, as I have found by repeated trials.

And it is worthy of remark, that ſo great is the Moon's influence in caſes of this nature, that upon the ſuppreſſion of theſe evacuations from one part, the blood forces its way through ſome other part: which was the caſe of the young gentleman mentioned above [r]. For when his ſpitting of blood was ſtopped by the medicines juſt now recited, he was at the ſame ſtated times ſeized with a bleeding at the noſe, which gave me no apprehenſions, as the principal organ was no longer affected.

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[p] Tom. iii. pag. 442. edit. 1736.

[q] Emmenalog. pag. 103.

[r] Pag. 182.

And this action of the Moon extends even to thoſe quadrupeds, that are menſtruated; for it has been obſerved, that they generally have thoſe evacuations about the new Moon: in particular mares and monkeys, and that ſo conſtantly, that, according to the teſtimony of Horus Apollo, the Egyptians painted the Cynocephalus to repreſent the Moon, upon account of a certain ſympathy, whereby the female of this animal has evacuations of blood from the uterus at the new and full Moon: and they kept monkeys in their temples, in order to point out the times of the conjunction of the Sun and Moon[s]. Wherefore the Moon's influence is apparent in all animals; provided irregularities in their way of living do not prevent it.

And this theory accounts for the periodical returns of the fluor albus, which are ſometimes obſerved, eſpecially if the diſcharge be from the uterine veſſels: for it iſſues ſometimes from theſe, and ſometimes from the glands of the vagina. In the firſt caſe, it ſtops upon the menſtrual purgations; in the latter, it flows with them, and continues even in pregnant women.

Running ulcers are likewiſe comprehended in this doctrine, it being no way ſurpriſing, that the forementioned cauſes ſhould increaſe the diſcharge of pus, eſpecially in thoſe parts, where the lax pliant texture of the body makes little or no reſiſtance to the diſtenſion of the veſſels. Hence in ulcers of the head it has been found, that the patients are in great danger at the new and full Moon.

The beſt method of treating nephritick pains, is to begin by blood-letting. And it will be of ſervice to the patient, to obſerve, when the paroxyſms are wont to return, and to empty the veſſels, at the time which threatens the greateſt danger. For it is well known, that this diſeaſe is partly occaſioned by the compreſſion of the ſmall ducts of the kidneys from the fulneſs of the capillary arteries; which fulneſs is increaſed by the new and full Moon. Whence I have more than once wondered, that the chief bent of the writers on this diſeaſe is, to drive down the gravel into the ureters and bladder: whereas the diſſection of dead bodies has taught me, as I have mentioned before, that the firſt rudiments of a calculus are a very limpid ſerum in the caruncles of the kidneys; and that this may harden to the conſiſtence of ſtone, will not ſeem ſtrange to thoſe, who are acquainted with the attractive force of ſalts in ſolution, and with the effects of obſtructions in the capillary veſſels. And hence it is, that calomel given now and then is of greater ſervice in the beginning of this diſeaſe, than any diureticks: becauſe this medicine removes the obſtructions of the minute veſſels, and thus prevents the coheſion of ſaline particles, which is frequently the conſequence of ſuch obſtruction. Moreover, daily experience ſhews, that too free an uſe of diureticks is prejudicial in diſeaſes of the kidneys. Which obſervation has not been ſufficiently attended to by ſome phyſicians, who not only patronized a certain monſtrous jumble of a medicine, till the legiſlature was wrought on to purchaſe the ſecret at an immenſe price; but ſtill go on to drench their patients with it, and thereby injure the ſtomach, kidneys, and bladder.

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[s] Hieroglyphic. vid. Geſner. de Simiis.

Aſthmatick diſorders are likewiſe heightened by the lunar action, both on account of a leſſer quantity of air taken into the lungs in each inſpiration, and of the diſtenſion of the veſſels by the rarefied blood: wherefore the returns of the fits are to be obſerved, and guarded againſt by moderate evacuations, as blood-letting, gentle vomits, laxatives, and ſometimes cathartícks. But every thing that heats the blood, ſhould be carefully avoided, eſpecially about the uſual times of the paroxyſms: becauſe there is generally then a lurking fever; which ought not to be exaſperated by heating food or medicines. Upon this ſcore Hippocrates adviſes perſons labouring under difficult breathing, to abſtain from clamours and anger [t]. And Van Helmont obſerved, that aſthmatick paroxyſms return more frequently in ſummer than winter [u]. For which reaſon, the proper medicines in this diſeaſe, beſides thoſe above mentioned, are ſuch as are cooling, and at the ſame time promote urine; as vinegar of ſquils; ſpirit of nitre; gas ſulphuris, which is water ſaturated with the fumes of ſulphur; and ſeveral others of the ſame nature, enumerated by Sir John Floyer.

To what has been ſaid above on criſes in acute diſeaſes, it may be worth while to add this one remark. Although great care ſhould be taken, not to raiſe any commotion in the humours on the coming on of a criſis; yet there are caſes, in which there is a neceſſity of making ſome evacuations: as for example, if the fever runs very high, the humours are ſo agitated, that no ſecretions can be performed. In this circumſtance phlebotomy is ſo far from obſtructing, that it promotes the criſis: in the ſame manner, as in the ſmall-pox and meaſles, before any appearance of the puſtules, when the turgeſcence of the humours is exceſſive, taking away ſome blood facilitates and haſtens the eruption.

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[t] Epidem. lib. vi. ſect. 4.

[u] De aſthm. & tuſſi.

The caſe is much the ſame with critical abſceſſes, wherein the fulneſs and feveriſh heat are ſometimes ſo great, that they require moderate evacuations, either by bleeding, or purging. For it is to be obſerved, that the reaſon, why the ancients condemned purging in fevers, was, that the moſt of their catharticks were very violent; as ſcammony, black hellebore, juice of ſpurge, and others of the like acrid nature: upon which account they contented themſelves with emptying the inteſtines by clyſters. But as we have always a good ſtock of gentle catharticks, we may ſafely give them at any time of the diſeaſe, without the leaſt apprehenſion of heating the body; eſpecially if nature points out this way, as ſhe frequently does.

COROLLARY.

Wherein the preceding reaſoning is confirmed by obſervations of the effects of ſtorms on the human body.

AS we have endeavoured to prove in the beginning of this treatiſe, that the celeſtial motions, which occaſion certain diſtempers, and their periods or returns at ſtated times, are likewiſe able to raiſe winds; and that we feel the different effects of theſe, according as other cauſes concur to put the air into violent agitations: it may not be amiſs to give ſome few inſtances, how much this reaſoning is confirmed by facts.

On the twenty-ſixth of November, 1703, there aroſe a moſt furious ſtorm of wind a little before midnight, which laſted upwards of ſix hours. The hiſtory and whole theory of this wonderful phænomenon I ſhall not attempt to compile. This province was by the Royal Society conferred on the learned Dr. Halley, who was every way equal to the taſk. Wherefore I ſhall only touch on ſome circumſtances of it, which more immediately relate to the preſent theme.

The Moon was then in her perigeum, and near the change: and it has been proved above, that both theſe circumſtances contribute towards attracting the air upwards, and raiſing winds;

winds [w]. Accordingly, the barometer was lower than uſual [x], and the ſubſequent tides were very high. And moſt probably there was a concurrence of one or more of the other cauſes already aſſigned [y], though it might be difficult to come at the knowledge of them: but as the ſtate of the weather in the preceding ſeaſons of the year is of eaſier, and perhaps not leſs uſeful, conſideration; I ſhall remark, that in thoſe places particularly, which felt the rage of the ſtorm, the ſummer and part of autumn were remarkably wet; and the winter was uſhered in by open warm weather; ſo that a thermometer, (whoſe freezing point was about eighty four) was very ſeldom below a hundred to the latter end of November [z]. Hence we may form a probable conjecture, that the atmoſphere was blended with vaſt quantities of ſaline and ſulphureous exhalations; which, by their various combinations and agitations, at length gave that deſtructive force to the motion of the air. And this conjecture is confirmed by the flaſhes or coruſcations, which were obſerved during the ſtorm; and by the ſaline particles found the next day on the leaves of vegetables, even at many miles diſtance from the ſea: where the graſs in ſome places taſted ſo ſalt, that the cattle did not care to eat it.

Inſtead of proſecuting this ſubject farther, I think it may not be amiſs to ſubjoin this remark; that as the new or full Moon is capable of cauſing thoſe alterations in the Human Body, which we have already mentioned, even when it is not ſeconded by any other cauſe; ſo if it be accompanied with a tempeſtuous ſtate of the weather, the effects will be the more ſenſibly felt. And indeed I myſelf remember, that ſeveral perſons complained particularly of head-achs the very night of the ſtorm. But the caſe of a lady of quality of my acquaintance is very remarkable, who was ſtruck blind in an inſtant that ſame night. Her blindneſs was the ἀμαύρωσις of the Greeks, or the gutta ſerena of the modern phyſicians: and as this is a diſtemper, which does not ſeem to me to be ſufficiently underſtood, I will offer my thoughts on it in few words.

The cauſe of it is generally an obſtruction and ſubſequent diſtenſion of the capillary arteries of the retina, or ſome injury done to the optick nerves. In the firſt kind, which is vaſtly the more common, the ſight is darkened gradually; in the laſt, the ſight is loſt, ſometimes ſooner, ſometimes later, according to the cauſe, and ſometimes infine in an inſtant.

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[w] Pag. 166, 167. [x] Phil. tranſ. No. 289. [y] Pag. 172.
[z] Phil. tranſ. No. 289.

For the optick nerves are injured many ways, and rendered incapable of performing their office: as by a blow, fall, fracture or depreſſure of the ſkull they are often compreſſed; in convulſions they are ſometimes loaded with extravaſated humours: and not uncommonly they are ſeized with a ſudden palſey. And in the diſſection of perſons, who had been long afflicted with epilepſies, I have obſerved, that the optick nerves were preſſed on by an extravaſated lymph collected juſt over the place, where after their junction they ſeparate, to run to the eyes: and in paralytick diſorders I have found the fibres in that place waſted and dry.

I could produce a number of obſervations from medical writers in confirmation of this theory: but I believe the following few may ſuffice. Felix Platerus, a phyſician of great experience, obſerved, in the diſſection of a dead body, a tumor, reſembling a gland, lying on the optick nerves, and obſtructing the paſſage of the animal ſpirits to the eye [a]. Guernerus Rolfincius found both the optick nerves waſted, in the body of a woman, which he opened [b]. Johannes Scultetus [c] ſaw the optick nerves waſted to half their uſual ſize, in the body of a woman, who had had a gutta ſerena for twenty years. And the Ephemerides naturæ curioſorum contain the unfortunate caſe of a young girl, who, from a blow on the left part of the head, was ſeized with a fever and delirium, then loſt her ſight and died ſoon after. Upon opening the head, a great quantity of limpid ſerum was found in the ventricles of the brain, eſpecially forwards, where it entirely compreſſed the optick nerves [d].

Now as to the caſe of the lady ſtruck blind during the ſtorm, I think it no difficult taſk to account for that misfortune upon the foregoing principles, by ſaying, that the Moon's action, vaſtly increaſed by the concurrence of the ſtorm, was capable of obſtructing the paſſage of the animal ſpirits to the optick nerves in a tender conſtitution, as effectually as if theſe nerves had been cut through; and conſequently of giving riſe to the gutta ſerena.

Concerning the uſe of this theory, I can ſafely ſay, that it has pointed out to me the true method of treating this diſtemper, which before my time was generally eſteemed incurable: and as the true knowledge of the cauſes of diſeaſes is a ſure foundation for practice, ſo I have ſucceeded in a number of trials on caſes of this kind. Wherefore when the capillary

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[a] Obſervat. lib. i. [b] Diſſert. anat. lib. iv. cap. 31 [c] Armament. chirurg. Obſ. 36. [d] Vid. miſcell. curioſ. anni 1686.

arteries

rteries are the ſeat of the diſeaſe, the proper medicines are thoſe, which moſt effectually attenuate the viſcid humours, nd remove the obſtruction: and ſuch are the chemical preparations of mercury. And theſe are to be continued a good while, and frequently even to raiſe a ſalivation, which is to be kept up twenty or thirty days.

But when the diſeaſe proceeds from a defect in the nerves, it requires a different method of cure from the preceding one; and it is to be varied according to the injury, which the nerves have received. But it plainly appears from what has been ſaid, that this ſpecies of the gutta ſerena is generally incurable. For who, but the Almighty Maker, can pretend to reſtore to the optick nerves their natural tenour, either when obſtructed, or their cavities ſtreightened by a viſcid ſluggiſh humour, or when waſted and ſhrivelled up; or to make a free paſſage for, and give a due impulſe to the animal ſpirits, when thoſe nerves are become paralytick? But if any hopes remain, while the diſeaſe is yet recent, a cauſtick is to be applied to the crown of the head, over the meeting of the coronal and ſagittal ſutures; and then the perioſteum is to be laid open, to make an outlet for the noxious humour from the brain. And this ulcer, like common iſſues, muſt be kept open with peas, and continued a long time: in the mean while the patient is to be put into a courſe of nervous cephalicks, as wild valerian root, Ruſſian caſtor, gum ammoniack, aſa fœtida, volatile ſpirits and ſalts of the animal tribe, &c.

But to return to ſtorms: there happened a moſt violent one in England, on the third day of September, 1658, the day of the death of Oliver Cromwell. As we have no journals of the weather for that year, that ever came to my knowledge, I can ſay nothing of the preceding ſtate of the air. But this is remarkable, that the ſtorm happened near the autumnal equinox, and about the full Moon: which concurrence of cauſes is very well adapted to ſtir up great commotions in the atmoſphere. However that be, it is to be obſerved, that the diſeaſe of that great man was of that kind, which we have ſhewn to be particularly under the Moon's influence. For it is upon record, that he died of a fever accompanied with grief, from the unhappy ſtate of his domeſtick affairs: and it is very certain, that grief diſpoſes the animal ſpirits to be eaſily affected by cauſes of this nature.

But to come to a concluſion of this little work; it has been obſerved of thoſe countries, which are ſubject to inundations, that theſe calamities generally happen at the times, when the Moon's action is moſt powerful: ſo that the learned

Baccius [e] ſeems to have reaſon for his conjecture, that the chief cauſe of theſe evils is to be ſought for in exceſſive high tides, with the unhappy concurrence of the attractive faculty of this or that planet.

Such are the natural cauſes of ſtorms and hurricanes: but as to the queſtion of the divine power, whether or no the wrath of the Almighty ſends theſe calamities on mankind, contrary to the ordinary courſe of nature, I will not take upon me to determine, who have no intention to diſengage men's minds from the bands of religion. For though I am thoroughly convinced, that each part of the univerſe is conſtituted and moved by certain laws; and that the ſame diſpoſition of the fabrick, which is the moſt convenient for the whole, ſometimes brings inconveniencies and even deſtruction in ſome particular places: yet it is highly equitable, that the Omnipotent Creator ſhould be allowed to have an abſolute dominion over all his works. And poſſibly it was agreeable to the divine wiſdom to create the world in ſuch a manner, that natural cauſes ſhould now and then produce evils and inconveniencies on mankind; whom it was neceſſary to affright with ſtorms, thunder, and other extraordinary phænomena, in order to keep them in a continual ſenſe of their duty.

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[e] Del Tevere, lib. iii. p. 228.

A
DISCOURSE
ON THE
PLAGUE.

To the RIGHT HONOURABLE

JAMES CRAGGS, Eſq;

ONE OF

His Majeſty's Principal Secretaries of State.

SIR,

I MOST humbly offer to you my thoughts concerning the prevention of the Plague, which I have put together by your Command. As ſoon as you were pleaſed to ſignify to me, in his Majeſty's abſence, that their excellencies the Lords Juſtices thought it neceſſary for the publick ſafety, upon the account of the ſickneſs now in France, that proper directions ſhould be drawn up to defend ourſelves from ſuch a calamity; I moſt readily undertook the task, though upon ſhort warning, and with little leiſure: I have therefore rather put down the principal heads of caution, than a ſet of directions in form.

The firſt, which relate to the performing quarantaines, &c. you, who are perfectly verſed in the hiſtory of Europe, will ſee are agreeable to what is practiſed in other countries, with ſome new regulations. The next, concerning the ſuppreſſing infection here, are very different from the methods taken in former times among us, and from what they commonly do abroad: but, I perſuade myſelf, will be found agreeable to reaſon.

I moſt heartily wiſh, that the wiſe meaſures, the government has already taken, and will continue to take, with regard to the former of theſe, may make the rules about the latter unneceſſary. However, it is fit, we ſhould be always provided with proper means of defence againſt ſo terrible an enemy.

May this ſhort eſſay be received as one inſtance, among many others, of the care, you always ſhew for your country; and as a teſtimony of the great eſteem and reſpect, with which I have the honour to be,

SIR,

Your moſt obedient, and

Moſt humble Servant,

Nov. 25,
1720.

R. MEAD.

PREFACE.

THIS book having at firſt been written only as a plan of directions for preſerving our country from the Plague[a] was then very ſhort and conciſe. An act of parliament being immediately after made for performing quarantaines, &c. according to the rules here laid down, it paſſed through ſeven editions in one year without any alterations. I then thought proper to make ſome additions to it, in order to ſhew the reaſonableneſs of the methods preſcribed, by giving a more full deſcription of this diſeaſe, and collecting ſome examples of the good ſucceſs which had attended ſuch meaſures, when they had been put in practice. At the ſame time I annexed a ſhort chapter relating to the cure of the Plague; being induced thereto by conſidering how widely moſt authors have erred in preſcribing a heap of uſeleſs and very often hurtful medicines, which they recommend under the ſpecious titles of antidotes, ſpecificks, and alexipharmacks: hoping that the great reſemblance, which I had obſerved between this diſeaſe and the ſmall-pox, would juſtify my writing upon a diſtemper which I have never ſeen.

Indeed the ſmall-pox is a true Plague, though of a particular kind, bred, as I have ſhewn all peſtilences are, in the ſame hot Egyptian climate, and brought into Aſia and Europe by the way of commerce; but moſt remarkably by the war with the Saracens, called the holy war, at the latter end of the eleventh and the beginning of the twelfth century[b]. Ever ſince which time the morbifick ſeeds of it have been preſerved in the infected cloaths and the furniture of houſes: and have broken out more or leſs in all countries, according as the hot and moiſt temperature of the air has favoured their ſpreading and the exertion of their force. The meaſles is likewiſe a Plague ſui generis, and owes its origin to the ſame country.

I have now reviſed my little work once more: and though I cannot find any reaſon to change my mind as to any material points which regard either the preventing or the ſtopping the progreſs of infection; yet I have here and there added ſome new ſtrokes of reaſoning, and, as the painters ſay, retouched the ornaments, and heightened the colouring of the piece.

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[a] See the dedication.

[b] Vid. Huet. De rebus ad eum pertinentibus, pag. 23.

The ſubſtance of the long preface to the laſt edition is as follows.

I have inſiſted more at large upon the infection of this diſeaſe, than I could ever have thought needful at this time, after Europe has had experience of the diſtemper for ſo many ages; had I not been ſurprized by the late attempts of ſome phyſicians in France to prove the contrary, even while they have the moſt undeniable arguments againſt them before their eyes. In particular, I cannot but very much admire to ſee Dr. Chicoyneau, and the other phyſicians, who firſt gave us obſervations on the Plague, when at Marſeilles, relate in the reflections, they afterwards publiſhed upon thoſe obſervations, the caſe of a man, who was ſeized with the Plague, upon his burying a young woman dead of it, when no one elſe dared to approach the body; and yet to ſee them aſcribe his diſeaſe, not to his being infected by the woman, but ſolely to his grief for the loſs of her, to whom he had made love, and to a Diarrhœa, which had been ſome time upon him [c]. No queſtion but theſe concurred to make his diſeaſe the more violent; and perhaps even expoſed him to contract the infection: but why ſhould it be ſuppoſed, that he was not infected, I cannot imagine, when there was ſo plain an appearance of it. I am as much at a loſs to find any colour of reaſon for their denying infection in another caſe, they relate, of a young lady ſeized with the Plague, upon the ſudden ſight of a peſtilential tumor, juſt broke out upon her maid; not allowing any thing but the lady's ſurprize to be the cauſe of her illneſs [d].

The truth is, theſe phyſicians had engaged themſelves in an hypotheſis, that the Plague was bred at Marſeilles by a long uſe of bad aliment, and grew ſo fond of their opinion, as not to be moved by the moſt convincing evidence. And thus it moſtly happens, when we indulge conjectures inſtead of purſuing the true courſe for making diſcoveries in nature.

I know they imagine this their ſentiment to be abundantly confirmed from ſome experiments made by Dr. Deidier [e] upon the bile taken from perſons dead of the Plague: which having been either poured into a wound made on purpoſe in different dogs, or injected into their veins, never failed, in many trials, to produce in them all the ſymptoms of the peſtilence, even the external ones of bubo's and carbuncles. One dog, upon which the experiment ſucceeded, had been known, for three months before, to devour greedily the corrupted fleſh of infected perſons, and pledgets taken off from peſtilential ulcers, without receiving any injury. From hence they conclude [f] that this diſeaſe is not communicated by contagion, but originally bred in the body by the corruption of the bile. This corruption, they ſay, is the effect of unwholeſome food; and the bile thus corrupted produces a thickneſs and a degree of coagulation in the blood, which is the cauſe of the Plague: though this they allow to be inforced by a bad ſeaſon of the year, and the terrors of mind and deſpair of the inhabitants.

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[c] Obſervations ſur la Peſte de Marſeille, p. 38, 39, 40. [d] Ibid. p. 113. [e] Philoſ. Tranſactions, No. 370.

Theſe experiments are indeed curious, but fall very ſhort of what they are brought to prove. The moſt that can be gathered from them is this: that dogs do not, at leaſt not ſo readily, receive peſtilential infection from men, as men do from one another: and alſo, that the bile is ſo highly corrupted in a body infected with the Plague, that by putting it into the blood of a dog it will immediately breed the ſame diſeaſe.

But it does not follow from hence, that the bile is the ſeat of the diſeaſe, or that other humours of the body are not corrupted as well as this. I make no queſtion but the whole maſs of blood is, in this caſe, in a ſtate of putrefaction; and conſequently that all the liquors derived from it partake of the taint.

Accordingly it appeared afterwards from ſome experiments made by Dr. Couzier [g], that not only the blood, but even the urine from an infected perſon, infuſed into the crural vein of a dog communicated the Plague. I will venture to affirm, that if, inſtead of bile, blood, or urine, the matter of the ulcers had been put into a wound made in the dog; it would have had at leaſt an equally pernicious effect: as may well be concluded from the inoculation of the ſmall-pox.

As to the dog's eating the corrupted fleſh and purulent matter of the patients; it ought to have been conſidered that here are ſome poiſons very powerful when mixed immediatey with the blood, which will not operate in the ſtomach at all: as in particular the ſaliva of the mad dog and the venom of the viper [h]. And therefore Dr. Deidier himſelf, ſome months after his former experiments, found that peſtiferous bile itſelf was ſwallowed by dogs without any harm [i].

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[f] Le Journal des Sçavans, 1722, pag. 279. [g] Vid. Differ-
tion ſur la contagion de la peſte. A Touloufe, 1724. [h] Vid.
Mechanical account of Poiſons, pag. 37.

The right inference to be made from theſe experiments, I think, would have been this: that ſince the blood and all the humours are ſo greatly corrupted in the Plague, as that dogs (though not ſo liable to catch the diſtemper in the ordinary way of infection, as men are) may receive it by a ſmall quantity of any of theſe from a diſeaſed ſubject being mixed with their blood; it may well be ſuppoſed, that the effluvia from an infected perſon, drawn into the body of one who is ſound, may be peſtiferous and productive of the like diſorder.

My aſſertion, that theſe French phyſicians have before them the fulleſt proofs of this infection, not only appears from theſe inſtances of it, I have obſerved to be recorded by themſelves; but likewiſe from what Dr. le Moine and Dr. Bailly [k] have written, of the manner in which the Plague was brought to Canourgue in the Gevaudan: as alſo from an amazing inſtance they give us of the great ſubtilty of this poiſon, experienced at Marvejols: where no leſs than ſixty perſons were at once infected in a church, by one that came thither out of an infected houſe. The Plague was carried from Marſeilles to Canourgue, as follows. A gally-ſlave, employed in burying the dead at Marſeilles, eſcaped from thence to the village of St. Laurent de Rivedolt, a league diſtant from Correjac: where finding a kinſman, who belonged to the latter place, he preſented him with a waiſtcoat and a pair of ſtockings he had brought along with him. The kinſman returns to his village, and dies in two or three days; being followed ſoon after by three children and their mother. His ſon, who lived at Canourgue, went from thence, in order to bury the family; and, at his return, gave to his brother-in-law a cloak he had brought with him: the brother-in-law laying it upon his bed, loſt a little child which lay with him, in one day's time; and two days after, his wife; himſelf following in ſeven or eight. The parents of this unhappy family, taking poſſeſſion of the goods of the deceaſed, underwent the ſame fate.

All this abundantly ſhews how inexcuſable the aforeſaid phyſicians in France are, in their oppoſing the common opinion that the Plague is contagious. However, I have paid ſo much regard to them, as to inſiſt the more largely upon the proof of that contagion; leſt the opinion of thoſe, who have had ſo much experience of the diſeaſe, might lead any one into an error, in an affair of ſuch conſequence, that all my precepts relating to quarantaines, and well nigh every particular part of my advice, depends upon it: for if this opinion were a miſtake, quarantaines, and all the like means of defence, ought to be thrown aſide as of no uſe. But as I continue perſuaded, that we have the greateſt evidence, that the Plague is a contagious diſeaſe; ſo I have left, without any alteration, all my directions in reſpect to quarantaines: in which, I hope, I have not recommended any thing prejudicial to trade; my advice being very little different from what has been long practiſed in all the trading ports of Italy, and in other places. Nay, were we to be more remiſs in this than our neighbours, I cannot think but the fear they would have of us, muſt much obſtruct our commerce.

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[i] Vid. Philoſ. Tranſ. No. 372.

[k] Vid. Lettre de Meſſieurs le Moine & Bailly.

But I ſhall purſue this point no farther: the rather becauſe a very learned phyſician among themſelves has ſince, both by ſtrong reaſoning and undeniable inſtances, evinced the reality of contagion[1].

In a word, the more I conſider this matter, the more I am convinced that the precepts I have delivered, both with regard to the preventing the Plague from coming into a country, and the treatment of it when preſent, are perfectly ſuitable to the nature of the diſtemper, and conſequently the fitteſt to be complied with. But how far, in every ſituation of affairs, it is expedient to grant the powers, requiſite for putting all of them in practice, it is not my proper buſineſs, as a phyſician, to determine. No doubt, but at all times, theſe powers ought to be ſo limited and reſtrained, that they may never endanger the rights and liberties of a people. Indeed, as I have had no other view than the publick good in this my undertaking, and the ſatisfaction of doing ſomewhat towards the relief of mankind, under the greateſt of calamities; ſo I ſhould not, without the utmoſt concern, ſee that any thing of mine gave the leaſt countenance to cruelty and oppreſſion.

But I muſt confeſs, I find no reaſon for any apprehenſions of this kind, from any thing I have advanced. For what extraordinary danger can there be, in lodging powers for the proper management of people under the Plague, with a council of health, or other magiſtrates, who ſhall be accountable, like all other civil officers, for their juſt behaviour in the execution of them? Though this I muſt leave to thoſe, who are better ſkilled in the nature of government. But ſure I am, that by the rules here given, both the ſick will be provided for with more humanity, and the country more effectually defended againſt the progreſs of the diſeaſe, than by any of the methods heretofore generally put in practice, either in our own, or in other nations.

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[1] Aſtruc, Diſſertation ſur la contagion de la Peſte. A Toulouſe, 1724., 8vo.

The uſage among us, eſtabliſhed by act of parliament, of impriſoning in their houſes every family the Plague ſeizes on, without allowing any one to paſs in or out, but ſuch as are appointed by authority, to perform the neceſſary offices about the ſick, is certainly the ſevereſt treatment imaginable; as it expoſes the whole family to ſuffer by the ſame diſeaſe; and conſequently is little leſs than aſſigning them over to the cruelleſt of deaths: as I have ſhewn in the diſcourſe.

The methods practiſed in France are likewiſe obnoxious to great objections. Crowding the ſick together in hoſpitals can ſerve to no good purpoſe; but inſtead thereof will promote and ſpread the contagion, and beſides will expoſe the ſick to the greateſt hardſhips. It is no ſmall part of the miſery, that attends this terrible enemy of mankind, that whereas moderate calamities open the hearts of men to compaſſion and tenneſs, this greateſt of evils is found to have the contrary effect. Whether men of wicked minds, through hopes of impunity, at theſe times of diſorder and confuſion, give their evil diſpoſition full ſcope, which ordinarily is reſtrained by the fear of puniſhment; or whether it be, that a conſtant view of calamities and diſtreſs does ſo pervert the minds of men, as to blot out all ſentiments of humanity; or whatever elſe be the cauſe: certain it is, that at ſuch times, when it ſhould be expected to ſee all men unite in one common endeavour, to moderate the publick miſery: quite otherwiſe, they grow regardleſs of each other, and barbarities are often practiſed, unknown at other times. Accordingly Diemerbroek informs us, that he himſelf had often ſeen theſe hoſpitals committed to the charge of villains, whoſe inhumanity has ſuffered great numbers to periſh by neglect, and that ſometimes they have even ſmothered ſuch as have been very weak, or have had nauſeous ulcers difficult to cure. Inſomuch, that in many places the ſick have choſe to lay themſelves in fields, in the open air, under the ſlighteſt coverings, rather than to fall into the barbarous hands of thoſe who have had the management of theſe hoſpitals[m]

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[m] Diemerbroek D Peſte, p. 120.

The rigorous reſtraints obſerved at their lines, are attended alſo with the like inconveniencies. For by abſolutely denying a paſſage to people from infected places, they ſubject to the ſame common ruin, both from the diſeaſe, and from the diſorders committed in ſuch places, thoſe, whom their fortunes would otherwiſe furniſh with means of eſcaping: and this, no doubt, in every free country, muſt be looked upon as an unjuſt infringement of liberty, and a diminution of mens natural rights, not to be allowed.

Now, under all theſe difficulties, I cannot but with the greateſt ſatisfaction obſerve, that my precepts are well nigh, nay altogether free from them; and yet a proper regard is had to the diſeaſe. As ſoon as ever the ſick are grown numerous, I adviſe, that they be left in their houſes, without any of thoſe unmerciful reſtraints heretofore put upon them and the families they belonged to. I might, perhaps, have juſtly directed, that whenever thoſe, who frequent or dwell in an infected houſe, go abroad, they ſhould be obliged to carry about them a long ſtick of ſome remarkable colour, or other viſible token, by which people may be warned from holding too free converſe with them: this being the practice on theſe occaſions, as I have heard, in ſome places. The removal of the ſick from their houſes, I adviſe only at the beginning, when it will be attended with none of the forementioned inconveniencies: but is what, for the moſt part, thoſe ſick ſhould themſelves deſire. It has hardly ever been known, when the diſeaſe did not firſt begin among the poor. Such therefore only will be ſubject to this regulation, whoſe habitations by the cloſeneſs of them are in all reſpects very incommodious for diſeaſed perſons. So that my advice chiefly amounts to the giving relief to the poor, who ſhall firſt be infected, by removing them into more convenient lodgings than their own, where they ſhall be better provided for than at home. And the removal of them will not be attended with that danger, it is natual for the unskilful to apprehend in ſo dreadful a diſeaſe; becauſe it is every day practiſed in the ſmall-pox, with great ſafety. And whereas I have before obſerved, that people have often ſuffered in the publick hoſpitals by the inhumanity of their attendants; in this caſe, little or nothing of that kind is to be feared: for I have propoſed this removal of the ſick only, at a time, when a long ſeries of calamities has not yet bred diſorders and hardneſs of heart. Nay, it may be reaſonably expected that they ſhould rather be uſed with the tendereſt care, when every one ſhall believe the ſtopping of the diſtemper, and conſequently their own ſafety to depend upon it. And as this treatment will be both ſafe and beneficial to the ſick, ſo it will be much more evidently for the advantage of the ſound part of the family, and of thoſe who live near them. For as the poorer ſort of people ſubſiſt by their daily labour, no ſooner ſhall the Plague have broke out among them, but the ſick families, and all their neighbours likewiſe, if not relieved by the publick, ſhall be abandoned to periſh by want, unleſs the progreſs of the diſtemper put a ſhorter period to their lives.

This obſervation, that the Plague uſually begins among the poor, was the reaſon, why I did not make any difference in my directions for removing the ſick, in regard to their different fortunes, when I firſt gave my thoughts upon this ſubject: which, however, to prevent cavils, I have at preſent done; and have ſhewn what method ought to be taken, if by ſome unuſual chance, the Plague ſhould at the beginning enter a wealthy family. And, in this caſe, I have adviſed nothing, which I would not moſt readily ſubmit to myſelf: for I ſhould much rather chuſe to be thus removed from my dwelling, with the diſtemper upon me, to ſave my family, than they, by being ſhut up with me, ſhould be all expoſed to periſh. And as this way of treating diſeaſed families is the moſt compaſſionate that can be deviſed with any regard to the reſtraining the progreſs of the diſtemper; ſo it is ſtill much preferable to what was formerly practiſed amongſt us, on other accounts. For, according to what I have adviſed, it is only required, to remove ſome few families at the beginning of the diſeaſe: whereas the method of ſhutting up houſes was continued through the whole courſe of the ſickneſs. Perhaps the Plague, under this management, may not reach half a ſcore families: I have given inſtances, where it has thus been ſtopt in one.

What relates to the incloſing infected places with lines, I have ſo regulated, that no body can be ſubjected to any degree of hardſhip thereby: for I have provided, that free liberty be given to every one, that pleaſes, to depart from the infected place, without being put to any other difficulty, than the performance of a ſhort quarantaine of about three weeks, in ſome place of ſafety. So that no one ſhall be compelled to continue in the infected town, whom his own circumſtances will not confine.

This part of my directions is not ſo general as the reſt, becauſe ſome places are too great to admit of it: which occaſioned my propoſing it with a reſtriction[n]. But as this is a great inconvenience to the reſt of the country, ſo it is far from being any advantage to the place thus left unguarded. For when all, who leave an infected place, carry with them certificates of their having ſubmitted to ſuch quarantaine, as may remove all cauſe of ſuſpicion, travelling will be much more ſafe and commodious, than otherwiſe it can be. For want of this, when the Plague was laſt at London, it was difficult to withdraw from it, while the country was every where afraid of ſtrangers, and the inns on the roads were unſafe to lodge in for thoſe, who travelled from the city; when it could not be known, but infection might be received in them by others come from the ſame place.

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[n] In theſe words. *Where it can be done?*

And from hence it happened that the Plague, when laſt in England, though much more moderate, and though it continued not above one year in the city of London, did yet ſpread itſelf over a great part of England, getting into Kent, even as far as Dover; into Suſſex, Hampſhire, Dorſetſhire, Eſſex, Suffolk, Norfolk, Cambridgeſhire, Northamptonſhire, Warwickſhire, Derbyſhire, and, to mention no more, as far as Newcaſtle [o].

Thus, as I have examined through the courſe of the following treatiſe, with all poſſible care, into the agreement of my precepts with the nature of the Plague; ſo I have now conſidered how far they can conveniently be put in practice.

But it is time to have done with a ſubject by no means agreeable.

I ſhall therefore conclude all I have to ſay upon this matter, with a paper well deſerving peruſal, which is come to my hands, ſince the following ſheets were finiſhed; and therefore too late to be made uſe of in its proper place: for which reaſon, I ſhall give it here entire. This paper contains the methods taken by his late majeſty, when the Plague in the year 1712, had entered his dominions in Germany. It was delivered to me from Mr. Backmeiſter, the ſecretary at Hanover to his majeſty for the German affairs, who was the perſon, that iſſued out the orders that were given. This relation I requeſted from the ſecretary, being deſirous to know how far the meaſures then taken, agreed with my directions: becauſe I had been informed, that they were very ſucceſsful. And I have the ſatisfaction to find them very conformable to my precepts; and that they had ſo much the deſired effect, as to ſtop the Plague from ſpreading beyond the ſmall number of towns and villages recited at the beginning of the paper.

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[o] Vid. the Gazettes of the years 1665 and 1666.

HANOVER, Feb. 10, N. S. 1722.

IN 1712 and 1713, the Plague raged in theſe parts, at the following places:

TOWNS.

Lunenbourg,
Zell,
Haarbourg, twice.

VILLAGES.

Nienfeldt
Holdenſtedt,
Melle,
Bienenbuttel,
Achem,
Trebel,
Brinckem,
Goldenſtedt
Fallingboſtel.

In the laſt place, three labouring men, who had made their eſcape from Hamburgh, got into a barn in the night, and were found dead there the next morning, with marks of the Plague upon them: but the progreſs of the infection was ſtopt by burning the barn.

As ſoon as any village was infected, the firſt thing done was to make a line round it, thereby to hinder the inhabitants from communicating with others. Thoſe who were thus ſhut up, were immediately furniſhed with proviſions: a phyſician was ſent to them; and eſpecially ſome ſurgeons; a miniſter to officiate particularly to perſons infected; a nurſe, buriers, &c.

The principal management of this whole affair conſiſted in two things: 1. In ſeparating the ſick from the ſound; and 2. In cleaning well the houſes which had been infected.

When any perſon was taken ill, he was obliged to leave his lodging, and retire into a lazaretto or hoſpital, built for that purpoſe. The other perſons, who appeared to be well in the ſame houſe, were obliged, when it was practicable, to ſtrip themſelves in the night quite naked, to put on other clothes, which were provided for them, and to go to perform quarantaine in a houſe appointed for it, after having burnt the clothes they had put off. Perſons were made to change their clothes, and thoſe they put off were burnt, as often as was judged neceſſary: for example, this was done when thoſe who had recovered their health, came out of the lazaretto and went into quarantaine; and likewiſe, when (after the diſeaſe was ceaſed) the women who attended the ſick, the buriers, and ſurgeons, went into quarantaine.

In ſummer, ordinary barracks (or huts) were made for thoſe of the common people, who were obliged to quit infected houſes: which barracks were afterwards burnt, when they had been made uſe of.

As ſoon as the people were come out of an infected houſe, it was nailed up, and centinels were poſted there, that nothing might be ſtolen out of it. In the country, when ſuch a houſe was not of very great value, and it might be done without danger, it was burnt, and the loſs was made good to the owner, at the expence of the publick. But in towns, where this could not be done, without the hazard of burning the town, men were hired to go into the houſes, and bring into the court-yard, or before the houſe, whatever goods they found in it ſuſceptible of contagion, and there burn them: but to prevent the fright which this might raiſe among the neighbours, ſuch goods were ſometimes put into the cart, uſed to carry off dead bodies, and ſo conveyed out of the town and burnt. At firſt the method taken, was only to bury ſuch goods deep in the ground: but it was found by ſeveral examples, that they were dug up again, and that the infection was thereby renewed. Before people were paid for their houſes and effects, that were burnt, it was diſcovered, that they often laid ſome of their goods out of the way, and that the contagion was ſpread by them; but after they came to be paid what was reaſonable, by the publick, they willingly let all be burnt, without concealing any thing.

In ſummer, the cattle were left abroad, and the inhabitants, who had not the Plague in their houſes, were obliged to look after them: in winter, the ſound perſons were obliged, before they left an infected houſe, to kill the cattle belonging to it, and to bury them ten foot deep in the ground near the houſe.

So far the former preface.

I Think it now proper to take notice, that an act of parliament (as abovementioned in this preface) formed upon the precepts here delivered, having been paſſed on December 8, 1720, the two laſt clauſes in the ſaid act, relating to the removing of ſick perſons from their habitations, and the making of lines about places infected, were on October 19, of the following year, repealed.

This looks as if the rules preſcribed were not right and juſt: I muſt therefore obſerve, in juſtification of myſelf, that this was not the caſe. Nothing was urged in that repeal againſt the reaſonableneſs of the directions in themſelves, more than in theſe words: that the execution of them might be very grievous to the ſubjects of this kingdom. But this I have proved to be quite otherwiſe.

The truth of the matter is this, ſome great men, both of the lords and commons, who were in the oppoſition to the court, objected that the miniſtry were not to be intruſted with ſuch powers, leſt they ſhould abuſe them; ſince they might, upon occaſion, by their officers, either remove or confine perſons not favoured by the government, on pretence that their houſes were infected.

Vain and groundleſs as theſe fears were, yet the clamours induſtriouſly raiſed from them were ſo ſtrong, that a great officer in the ſtate thought fit to oblige his enemies by giving way to them: and though a motion made in the houſe of commons for repealing theſe two clauſes had juſt been rejected; yet upon making the ſame in the houſe of lords, with his conſent, the thing was done.

Whether private or publick conſiderations had the greater ſhare in bringing about this compliance, I will not determine. Such counter-ſteps will happen in a government, where there is too much of faction, and too little of a publick ſpirit. This I very well remember, that a learned prelate, now dead, who had more of political than of chriſtian zeal, and was one who made the loudeſt noiſe about the quarantaine bill, frankly owned to me in converſation, that though the directions were good, yet he and his friends had reſolved to take that opportunity of ſhewing their diſaffection to the miniſtry.

But after all, it contributed not a little to the carrying this point, that the Plague was now ceaſed at Marſeilles, and a ſtop put to its progreſs in the provinces. And I cannot but take notice, that this laſt good ſervice was done by the ſame method, which, though in a more moderate way, I have here propoſed. For it is well known that the regent of France did at laſt ſet bounds to the contagion by lines and barriers guarded by ſoldiers: which wiſe reſolution ſaved not only his own but other countries from the ſpreading of a diſeaſe, which ſeems to have been of as violent a kind, as ever was brought into Europe.

However, if there were any ſeverity in orders of this kind, every man ought to conſider himſelf as a member of the ſociety; by the laws of which as he receives many advantages, ſo he gives up ſomewhat of his own private rights to the publick: and muſt therefore be perfectly ſatisfied with whatever is found neceſſary for the common good; although it may, on particular occaſions, bring upon him ſome inconveniences and ſufferings.

Salus Populi ſuprema Lex eſt.

Does any body complain of ill uſage upon his houſe being ordered to be blown up, to ſtop the progreſs of a fire which endangers the whole ſtreet; when he reflects that his neighbour, who by this means eſcapes, muſt have ſuffered the ſame loſs for his ſake; had it ſo happened that each had been in the other's habitation?

But in truth, there is no cruelty, but on the contrary real compaſſion in theſe regulations, with the limitations I have made: and I am fully perſuaded that whoever with judgment conſiders the nature of this diſeaſe, will eaſily ſee that the rules here laid down are not only the beſt, but indeed the only ones that can effectually anſwer the purpoſe. And therefore I ſhould not doubt but that, if this calamity (which God avert!) ſhould be brought into our country, even the voice of the people would cry out for help in this way: notwithſtanding wrong notions of their liberties may ſometimes over poſſeſs their minds, and make them, even under the beſt of governments, impatient of any reſtraints.

PART I.

OF THE PLAGUE IN GENERAL.

CHAP. I.

Of the origin and nature of the Plague.

MY deſign in this diſcourſe being to propoſe what meaſures I think moſt proper to defend the nation againſt the Plague, and for this end to conſider the nature of peſtilential contagion as far as is neceſſary to ſet forth the reaſonableneſs of the precepts I ſhall lay down; before I proceed to any particular directions, I ſhall enquire a little into the cauſes, whence the Plague ariſes, and by what means the infection of it is ſpread.

In the moſt antient times Plagues, like many other diſeaſes, were looked upon as divine judgments ſent to puniſh the wickedneſs of mankind: and therefore the only defence ſought after was by ſacrifices and luſtrations to appeaſe the anger of incenſed heaven [a].

How much ſoever may be ſaid to juſtify reflexions of this kind, ſince we are aſſured from ſacred hiſtory, that divine vengeance has been ſometimes executed by Plagues; yet it is certain, that ſuch ſpeculations puſhed too far, were then attended with ill conſequences, by obſtructing inquiries into natural cauſes, and encouraging a ſupine ſubmiſſion to thoſe evils: againſt which the infinitely good and wiſe author of nature has in moſt caſes provided proper remedies.

Upon this account, in after-ages, when the profeſſion of phyſick came to be founded upon the knowledge of nature, Hippocrates ſtrenuouſly oppoſed this opinion, that ſome particular ſickneſſes were divine, or ſent immediately from the God's: and affirmed, that no diſeaſes came more from the Gods than others, all coming from them, and yet all owning their proper natural cauſes: that the ſun, cold, and winds were divine; the changes of which, and their influences on human bodies, were diligently to be conſidered by a phyſician [b].

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[a] Celſus de Medic. in Præfat. Morbus ad iram deorum immortalium relatos eſſe, & ab iiſdem opem poſci ſolitam.

Which general poſition this great author of phyſick intended to be underſtood with reſpect to Plagues as well as other diſtempers: how far he had reaſon herein, will in ſome meaſure appear, when we come to ſearch into the cauſes of this diſeaſe.

But in order to this inquiry, it will be convenient, in the firſt place, to remove an erroneous opinion ſome have entertained, that the Plague differs not from a common fever in any thing beſides its greater violence. Whereas it is very evident, that ſince the ſmall-pox and meaſles are allowed to be diſtempers diſtinct in ſpecie from all others, on account of certain ſymptoms peculiar to them; ſo, for the ſame reaſon, it ought to be granted, that the Plague no leſs differs in kind from ordinary fevers: for there are a ſet of diſtinguiſhing ſymptoms as eſſential to the peſtilence, as the reſpective eruptions are to the ſmall-pox or meaſles; which are indeed (as I have mentioned in the preface) each of them Plagues of a particular kind.

As the ſmall-pox diſcharges itſelf by puſtules raiſed in the ſkin; ſo in the Plague the noxious humour is thrown out either by tumours in the glands, as by a parotis, bubo, and the like; or by carbuncles thruſt out upon any part of the body. And theſe eruptions are ſo ſpecifick marks of this diſtemper, that one or other of them is never abſent: unleſs through the extreme malignity of the diſeaſe, or weakneſs of nature, the patient ſinks, before there is time for any diſcharge to be made this way; that matter, which ſhould otherwiſe have been caſt out by external tumors ſeizing the viſcera, and producing mortifications in them.

Sometimes indeed it happens, by this means, that theſe tumors in the glands, and carbuncles, do not appear; juſt as a bad kind of the ſmall-pox in tender conſtitutions ſometimes proves fatal before the eruption, by a diarrhœa, hæmorrhage, or ſome ſuch effect of a prevailing malignity.

The French phyſicians having diſtinguiſhed the ſick at Marſeilles into five claſſes, according to the degrees of the diſtemper, obſerved bubo's and carbuncles in all of them, except in thoſe of the firſt claſs, who were ſo terribly ſeized, that they died in a few hours, or at fartheſt in a day or two, ſinking under the oppreſſion, anxiety, and faintneſs, into which they were thrown by the firſt ſtroke of the diſeaſe; having mortifications immediately produced in ſome of the viſcera, as appeared upon the diſſection of their bodies [c]. And this obſervation of the French phyſicians, which agrees with what other authors have remarked in former Plagues, fully proves, that theſe eruptions are ſo far from being cauſed ſolely by the greater violence of this diſeaſe, than of other fevers, that they are only abſent, when the diſtemper is extraordinary fierce; but otherwiſe they conſtantly attend it, even when it has proved ſo mild, that the firſt notice the patient has had of his infection, has been the appearance of ſuch a tumor: as, beſides theſe French phyſicians, other authors of the beſt credit have aſſured us. From whence we muſt conclude, that theſe eruptions are no leſs a ſpecifick mark of this diſeaſe, than thoſe are, by which the ſmall-pox and meaſles are known and diſtinguiſhed. And as in the firſt claſs of thoſe attacked with the Plague, ſo likewiſe in theſe two diſtempers we often find the patient to die by the violence of the fever, before any eruption of the puſtules can be made.

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[b] Libr De morbo ſacro; & libri. De aëre, locis, & aquis.

This circumſtance of the Plague being mortal before any eruptions appeared, was attended with a great misfortune. The phyſicians and ſurgeons appointed to examine the dead bodies, finding none of the diſtinguiſhing marks of the diſeaſe, reported to the magiſtrates that it was not the Plague; and perſiſted in their opinion, till one of them ſuffered for his ignorance, and himſelf, with part of his family, died by the infection: this aſſurance having prevented the neceſſary precautions [d].

And this in particular ſhews us the difference between the true Plague, and thoſe fevers of extraordinary malignity, which are the uſual fore-runners of it, and are the natural conſequence of that ill ſtate of air, we ſhall hereafter prove to attend all Plagues. For ſince all thoſe fevers, from which people recover without any diſcharge by tumors in the glands, or carbuncles, want the characteriſtick ſigns, which have been ſhewn to attend the ſlighteſt caſes of the true Plague; we cannot, upon any juſt ground, certainly conclude them to be a leſs degree only of that diſtemper: but ſo far as appears, they are of a different nature, are not ordinarily contagious like the Plague, nor yet have any ſuch neceſſary relation to it, but that ſuch fevers do ſometimes appear without being followed by a real peſtilence.

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[c] Obſervat. & Reflex. touchant la nature, &c. de la Peſte de Marſeilles, pag. 47. & ſuiv.

[d] Journal de la Contagion à Marſeilles, pag. 6.

On the other hand, I would not be underſtood to call every fever a Plague, which is followed by eruptions reſembling theſe here mentioned: for as every boil or puſtule, which breaks out upon the ſkin, is not an indication of the ſmall-pox, nor every ſwelling in the groin a venereal bubo; ſo there are carbuncles not peſtilential, and other fevers, beſides the Plague which have their criſis by tumors and abſceſſes, and that ſometimes even in the parotid or other glands. There is indeed uſually ſome difference between theſe ſwellings in the Plague, and in other fevers, eſpecially in the time of their coming out: for in the Plague they diſcover themſelves ſooner than in moſt other caſes. But the principal difference between theſe diſeaſes, is, that the Plague is infectious, the other not; at leaſt not to any conſiderable degree.

And this leads me to another character of this diſeaſe, whereby it is diſtinguiſhed from ordinary fevers, which is the contagion accompanying it. This is a very antient obſervation. Thucydides makes it a part of his deſcription of the Plague at Athens [e]; and Lucretius, who has almoſt tranſlated this deſcription of Thucydides, dwells much upon it [f]. Ariſtotle makes it one of his problems [g], How the Plague infects thoſe who approach to the ſick. And what is of more conſequence, Galen himſelf is very clear in it [h]; for he has theſe words: ὅτι συνδιατρίβειν τοῖς λοιμώττουσιν ἐπισφαλὲς, ἀπολαῦσαι γὰρ κίνδυνος, ὥσπερ ψώρας τινὸς, &c. that it is unſafe to be about thoſe who have the the Plague, for fear of catching it, as in the itch, &c. Indeed this is a thing ſo evident, that we find it at preſent the current opinion of all mankind, a very few perſons only excepted, who have diſtinguiſhed themſelves by their ſingularity in maintaining the oppoſite ſentiment. And it is ſomething ſtrange that any one ſhould make a queſtion of a thing ſo obvious, which is proved ſufficiently by one property only of the diſeaſe, that whenever it ſeizes one perſon in a houſe, it immediately after attacks the greateſt part of the family. This effect of the Plague has been ſo remarkable at all times, that whoever conſiders it well, cannot poſſibly, I think, have any doubt remaining, or require any ſtronger argument to convince him, that the diſeaſe is infectious. For this very reaſon, the ſmall-pox and meaſles are generally allowed to be contagious; becauſe it is obſerved, that when either of theſe diſeaſes is got among a family, it uſually ſeizes ſucceſſively the greateſt part of that family, who have not had it before: at leaſt if ſuch in the family hold free communication with the ſick. And by the ſame argument the Plague muſt be concluded to be infectious likewiſe. It cannot be pretended, that this is occaſioned in the Plague from this only, that the ſound perſons are rendered more than ordinarily obnoxious to the unhealthy air, or whatever be the common cauſe of the diſeaſe, by being put into fear and diſpirited, upon ſeeing others in the ſame houſe taken ſick: for if this were the caſe, children, who are too young to have any apprehenſions upon this account, would eſcape better than others, the contrary of which has been always experienced.

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[e] Lib. 2. Ὅτι ἕτερος ἀφ᾽ ἑτέρου, θεραπείας ἀναπιμπλάμενοι, ὥσπερ τὰ πρόβατα ἔθνησκον· καὶ τὸν πλεῖστον φθόρον τοῦτο ἐνεποίει· εἴτε γὰρ μὴ θέλοιεν δεδιότες ἀλλήλοις προσιέναι, ἀπώλλυντο ἔρημοι. καὶ οἰκίαι πολλαὶ ἐκενώθησαν ἀπορίᾳ τοῦ θεραπεύσαντος· εἴτε προσίοιεν, διεφθείροντο, καὶ μάλιστα οἱ ἀρετῆς τι μεταποιούμενοι. The beginning of this paſſage, as it here ſtands, though it is founded thus in all the editions of Thucydides, is certainly faulty, θεραπείας ἀναπιμπλάμενοι being no good ſenſe. The ſentence I ſhall preſently cite from Ariſtotle ſhews that this may be rectified only by removing the comma after ἑτέρου, and placing it after θεραπείας; for προσαναπίμπλημι in Ariſtotle abſolutely uſed ſignifies to infect. With this correction, the ſenſe of the place will be as follows: The people took infection by their attendance on each other, dying like folds of ſheep. And this effect of the diſeaſe was the principal cauſe of the great mortality: for either the ſick were left deſtitute, their friends fearing to approach them, by which means multitudes of families periſhed without aſſiſtance; or they infected thoſe who relieved them, and eſpecially ſuch, whom a ſenſe of virtue and honour obliged moſt to their duty.

The ſenſe here aſcribed to the word ἀναπίμπλημι, is confirmed yet more fully by a paſſage in Livy, where he deſcribes the infection attending a Plague or camp fever, which infeſted the armies of the Carthaginians and Romans at the ſiege of Syracuſe, in ſuch words, as ſhew him to have had this paſſage of Thucydides in view; for he ſays, *aut neglecti deſertique, qui incidiſſent, morirentur; aut aſſidentes curanteſque eadem vi morbi repletos ſecum traherent.* Lib. XXV. c. 26.

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[f] Lib. vi. ℣. 1234.

——— *nullo ceſſabant tempore apiſci*
Ex aliis alios avidi contagia morbi.

Et ℣. 1241.

Qui fuerant autem præſto, Contagibus ibant.

[g] Sect. I. Διατί ποτε ὁ λοιμὸς μόνη τῶν νόσων μάλιστα τοὺς πλησιάζοντας τοῖς θεραπευομένοις προσαναπίμπλησι;

[h] Περὶ διαφορᾶς πυρετῶν, βιβ. ά.

It is true, ſome have not been attacked by the diſeaſe, though conſtantly attending about the ſick. But this is no objection againſt what is here advanced: for it is as eaſily underſtood how ſome perſons, by a particular advantage of conſtitution, ſhould reſiſt infection, as how they ſhould conſtantly breathe a noxious air without hurt. An odd obſervation of Diemerbroek deſerves notice in this place; That, part of a family removed into a town free from the Plague, was obſerved by him to be taken ill of it ſoon after the part left behind in the diſeaſed town fell ſick: which certainly would ſcarce have happened, unleſs a communication between the healthy and the ſick, by letters or otherwiſe, was capable of cauſing it [h]. Of the ſame nature is a circumſtance recorded by Evagrius of the Plague, which he deſcribes, and what, he owns, ſurprized him very much: that, many of thoſe, who left infected places, were ſeized with the Plague in the towns to which they had retired, while the old inhabitants of thoſe towns were free from the diſeaſe [i]. But to multiply proofs of a thing ſo evident, is needleſs; innumerable are at hand, and ſeveral will occaſionally occur in the following parts of this diſcourſe, when we come to ſpeak in particular of the ways, by which this infection is conveyed about. I ſhall therefore ſay no more in this place, but only, that all the appearances attending this diſeaſe are very eaſily explained upon this principle, and are hardly to be accounted for upon any other. We learn from hence the reaſon why when the Plague makes its firſt appearance in any place, though the number of ſick is exceeding ſmall, yet the diſeaſe uſually operates upon them in the moſt violent manner, and is attended with its very worſt ſymptoms. Now was the diſeaſe produced not by imported contagion, but from ſome cauſe, which had its original in the diſeaſed place, and conſequently from a cauſe gradually bred, the contrary muſt happen: the diſeaſed would at firſt not only be few in number, but their ſickneſs likewiſe more moderate than afterwards, when the morbifick cauſes were raiſed to their greateſt malignity. From the ſame principle we ſee the reaſon, why people have often remained in ſafety in a diſeaſed town, only by ſhutting themſelves up from all communication with ſuch, as might be ſuſpected of giving them the diſeaſe. When the Plague was laſt in England, while it was in the town of Cambridge, the colleges remained entirely free by uſing this precaution. In the Plague at Rome in the years 1656 and 1657, the monaſteries and nunneries, for the moſt part, defended themſelves by the ſame means [k]: whereas at Naples, where the Plague was a little before, theſe religious houſes, from their neglect herein, did not eſcape ſo well [l]. Nay the infection entered none of the priſons at Rome [m], though the naſtineſs of thoſe places expoſes them very much. But, to avoid prolixity, I ſhall give only one inſtance more. I think it cannot be explained in any other reaſonable manner, how the laſt Plague in the city of London, which broke out in the pariſh of St. Giles's in the Fields towards the latter end of the year 1664, ſhould lie aſleep from Chriſtmas to the middle of February, and then break out again in the ſame pariſh; and after another long reſt till April, ſhew itſelf again in the ſame place [n].

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[h] De Peſte, c. iv. annot. 6.

[i] Evagrii Hiſtor. Eccleſ. lib. v. c. 29.

To proceed: whoever examines the hiſtories of Plagues in all times, which have been deſcribed with any exactneſs, will find very few, that do not agree in theſe eſſential marks, whereby the Plague may be diſtinguiſhed from other fevers. I confeſs an inſtance or two may be found to the contrary: perhaps the hiſtory of our own country furniſhes the moſt remarkable of any [o]. But examples of this kind are ſo very rare, that I think it muſt be concluded, that the Plague is uſually one and the ſame diſtemper.

In the next place, I ſhall endeavour to ſhew, that the Plague has always the ſame original, and is brought from Africa, the country which has entailed upon us two other infectious diſtempers, the ſmall-pox and meaſles. In all countries indeed epidemick diſeaſes extraordinarily mortal, are frequently bred in jails, ſieges, camps, &c. which authors have often in a large ſenſe called peſtilential: but the true Plague, which is attended with the diſtinguiſhing ſymptoms before deſcribed, and which ſpreads from country to country, I take to be an African fever bred in Æthiopia or Egypt, and the infection of it carried by trade into the other parts of the world.

It is the obſervation of Pliny, that the peſtilence always travels from the ſouthern parts of the world to the weſtern, that is, in his phraſe, into Europe [p]. And the moſt accurate accounts in all times of this diſeaſe, wherever it has raged, bring it from Africa. Thucydides [q], in his admirable deſcrip-

[k] Gaſtaldi De avertenda & profliganda Peſte, p. 117.

[l] Ibid. p. 118.

[m] Ibid. p. 117.

[n] See Bills of Mortality for the year 1665.

[o] The ſweating ſickneſs.

[p] Nat. Hiſt. lib. vii. c. 50.

[q] Hiſtor. lib. ii.

tion of the famous Plague of Athens, ſays, that it began in Upper Æthiopia, then came into Egypt, from whence it was ſpread firſt into Perſia, and afterwards into Greece.

There is in all antient hiſtory no account of any Plague ſo dreadful as that, which broke out at Conſtantinople in the time of the emperor Juſtinian, A. D. 543. This is ſaid to have ſpread its infection over all the earth, and to have laſted fifty-two years. The hiſtory of it is very well told by Evagrius[r], and yet more learnedly by Procopius[s]: and they both obſerve, that the diſtemper had its birth in Æthiopia or Egypt.

This is likewiſe agreeable to the modern relations of travellers and merchants from Turkey, who generally inform us, that the frequent Plagues, which depopulate that country, are brought thither from the coaſt of Africa: inſomuch that at Smyrna, and other ports of that coaſt, they often know the very ſhip which brings it. And, in theſe latter ages, ſince our trade with Turkey has been pretty conſtant, the Plagues in theſe parts of Europe have evidently been brought from thence.

The late Plague in France came indiſputably from Turkey, as I ſhall particularly ſhew in ſome of the following pages. The Plague, which broke out at Dantzick in the year 1709, and ſpread from thence to Hamburgh, Copenhagen, and other cities in the north, made its way thither from Conſtantinople through Poland, &c. And the laſt Plague in this city, if we may believe Dr. Hodges, had the ſame original, being brought to us from Holland, but carried to them by cotton imported from Turkey[t].

The greateſt mortality that has happened in latter ages, was about the middle of the fourteenth century; when the Plague ſeized country after country for five years together[u]. In the year 1346 it raged in Egypt, Turkey, Greece, Syria, and the Eaſt-Indies; in 1347 ſome ſhips from the Levant carried it to Sicily, Piſa, Genoa, &c. in 1348 it got into Savoy, Provence, Dauphiny, Catalonia, and Caſtile, &c. in 1349 it ſeized England, Scotland, Ireland, and Flanders; and the next year Germany, Hungary, and Denmark: and in all places, where it came, it made ſuch heavy deſtruction, that it is ſaid to have diſpeopled the earth of more than half its inhabitants[x]. Now ſince Africa had a ſhare of this Plague in the very beginning, I queſtion not but it had its riſe in that country; and not in China, as M. Villanni, in his hiſtory of thoſe times, relates from the report of Genoeſe ſeamen, who came from thoſe parts, and ſaid it was occaſioned there by a great ball of fire, which either burſt out of the earth, or fell down from heaven [y]. But this relation is ſo very incredible, that I cannot think we ought at all to rely upon it: ſeeing we have no inſtance of a Plague, which was originally bred in that country.

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[r] Hiſtor. Eccleſiaſt. lib. iv. c. 29.

[s] De Bello Perſico, lib. ii. c. 22.

[t] Vid. Hodges De Peſte.

[u] Vid. Iſtorie di Matteo Villanni, l. i. c. 2.

[x] Mezeray Hiſt. de France, Tom. i. p. 798.

It is very remarkable, that the ſeveral countries of Europe have always ſuffered more or leſs in this way, according as they had a greater or leſſer commerce with Africa; or with thoſe Parts of the eaſt that have traded thither. Which obſervation, by the by, may help to ſolve a difficulty concerning the great increaſe of people among the northern nations in antient times, more than at preſent; for in thoſe ages, having no communication at all with Africa, they were not waſted with Plagues, as they have been ſince.

As the people of Marſeilles, from the firſt foundation of their city by the Phoceans, were famous for trade, and made long voyages ſouthwards on the African coaſt [z]; ſo they have in all times been very liable to the Plague. A French author [a], in a hiſtory of the late Plague at Marſeilles, reckons up twenty Plagues that have happened in that city; notwithſtanding it is by its ſituation one of the moſt healthy and pleaſant places in France, and the leaſt ſubject to epidemick diſtempers. But if we had no records of this in hiſtory, an odd cuſtom among them, mentioned in antiquity [b], of the way they made uſe of to clear themſelves from this diſtemper, would be a proof of it. Their manner at ſuch times was, that ſome one poor man offered himſelf to be maintained at the publick expence with delicate food for a whole year: at the end of which he was led about the city dreſſed in conſecrated garments and herbs; and being loaded with curſes as he went along, that the evils of the citizens might fall upon him, he was at laſt thrown into the ſea [c].

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[y] Villanni. loco citato.

[z] Vid. Huet. Hiſtoire du Commerce des Anciens, p. 88.

[a] Relation Hiſtorique de tout ce qui s' eſt paſſé à Marſeille pendent la derniere Peſte.

[b] Vid. Serv. Comment. in Virgil. Æneid, lib. iii. ℣. 57.

[c] This was a kind of expiatory ſacrifice, as the ſcape goat among the Jews, Lev. xvi. And the wretches thus devoted to die for the ſins of the people were called Καθάρματα, Purgations. Vid. Ariſtophan. in Plut. ver. 454. & in Equit. ver. 1133. &Scholiaſt. ibid. Suidas adds, that

Agreeable to this remark upon trade is the obſervation of Procopius in his forecited hiſtory, that the Plague was always found to ſpread from maritime places into the inland countries: which has ever ſince been confirmed by experience.

Having ſhewn this diſeaſe to be a diſtemper of a diſtinct Species, and to take its riſe only in Africa; we muſt next ſeek for its cauſe in that country, and no where elſe. We ought therefore to conſider, what there is peculiar to that country, which can reaſonably be ſuppoſed capable of producing it. Wherefore I ſhall briefly ſet down as much as ſerves for this purpoſe of the ſtate of Grand Cairo in Egypt, and of Æthiopia, the two great ſeminaries of the Plague: travellers relating that theſe countries are more infeſted with it than moſt other parts of Africa.

Grand Cairo is crouded with vaſt numbers of inhabitants, who for the moſt part live very poorly, and naſtily; the ſtreets are very narrow, and cloſe: it is ſituated in a ſandy plain at the foot of a mountain, which by keeping off the winds, that would refreſh the air, makes the heats very ſtifling. Through the midſt of it paſſes a great canal, which is filled with water at the overflowing of the Nile; and after the river is decreaſed, is gradually dried up: into this the people throw all manner of filth, carrion, &c. ſo that the ſtench which ariſes from this, and the mud together, is inſufferably offenſive[d]. In this poſture of things, the Plague every year conſtantly preys upon the inhabitants; and is only ſtopt, when the Nile, by overflowing, waſhes away this load of filth; the cold winds, which ſet in at the ſame time, lending their aſſiſtance, by purifying the air.

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that when the ſacrificed perſon was caſt into the water, theſe words were pronounced, Περίψημα ἡμῶν γενοῦ, Be thou our cleanſing. And I obſerve, by the by, that the apoſtle Paul, 1 Corinth. iv. 13. alluding very probably to this wicked cuſtom, makes uſe of both theſe words, where ſpeaking of himſelf in the plural number, he ſays, Ὡς περικαθάρματα τοῦ κόσμου ἐγενήθημεν πάντων περίψημα; for ſome of the beſt MSS. inſtead of Ὡς περικαθάρματα, read ὥσπερ, or ὡσπερεὶ καθάρματα; that is, We have been looked upon as wretches fit only to be ſacrificed for the publick good, and caſt out of the world by way of atonement for the ſins of the whole ſociety.

[d] Vid. Le Brun Voyage au Levant, c. xxxviii.

In Æthiopia thoſe prodigious ſwarms of locuſts, which at ſome times cauſe a famine, by devouring the fruits of the earth, unleſs they happen to be carried by the winds clear off into the ſea, are obſerved to entail a new miſchief upon the country, when they die and rot, by raiſing a peſtilence [e]; the putrefaction being heightened by the exceſſive intemperance of the climate, which is ſo very great in this country, that it is infeſted with violent rains at one ſeaſon of the year, for three or four months together [f]. And it is particularly obſerved of this country, that the Plague uſually invades it, whenever rains fall during the ſultry heats of July and Auguſt [g], that is, as Lucretius expreſſes it, when the earth is

Intempeſtivis pluviiſque & ſolibus icta [h].

Now if we compare this laſt remark of the intemperance of the climate in Æthiopia, with what the Arabian phyſicians [i], who lived near theſe countries, declare, that peſtilences are brought by unſeaſonable moiſtures, heats, and want of winds; I believe we ſhall be fully inſtructed in the uſual cauſe of this diſeaſe. Which from all theſe obſervations compared together, I conclude to ariſe from the putrefaction ſo conſtantly generated in theſe countries, when that is heightened and increaſed by the ill ſtate of air now deſcribed; and eſpecially from the putrefaction of animal ſubſtances.

It is very plain, that animal bodies are capable of being altered into a matter fit to breed this diſeaſe: becauſe this is the caſe of every one who is ſick of it, the humours in him being corrupted into a ſubſtance which will infect others. And it is not improbable, that the volatile parts with which animals abound, may in ſome ill ſtates of air in the ſultry heats of Africa be converted by putrefaction into a ſubſtance of the ſame kind: ſince in theſe colder regions, we ſometimes find them to contract a greater degree of acrimony than moſt other ſubſtances will do by putrefying, and alſo more dangerous for men to come within the reach of their action; as in thoſe pernicious, and even poiſonous juices, which are ſometimes generated in corrupted carcaſſes: of which I have formerly given one very remarkable inſtance [k], and, if it were neceſſary, many more might be produced, eſpecially in hydropick bodies, and in cancerous tumours. Nay more, we find animal putrefaction ſometimes to produce in theſe northern climates very fatal diſtempers, though they do not ariſe to the malignity of the true Plague: for ſuch fevers are often bred, where a large number of people are cloſely confined together; as in jails, ſieges, and camps.

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[e] Vid. Ludolf. Hiſtor. Æthiop. lib. i. c. 13. & D. Auguſt. De civitat. Dei, lib. iii. c. ult.

[f] Vid. Ludolf. Hiſtor. Æthiop. lib. i. c. 5. & comment.

[g] J. Leo Hiſt. Afric. lib. i.

[h] Lib. vi. ℣. 1100.

[i] Rhaſ. & Avicen.

[k] Eſſay on Poiſons.

And perhaps it may not be here amiſs to remark, that the Ægyptians of old were ſo ſenſible how much the putridneſs of dead animals contributed towards breeding the Plague, that they worſhipped the bird Ibis for the ſervice it did in devouring great numbers of ſerpents; which they obſerved did hurt by their ſtench when dead, as well as by their bite when alive [1].

But no kind of putrefaction is ever heightened in theſe European countries to a degree capable of producing the true Plague: and we learn from the obſervation of the Arabian phyſicians, that ſome indiſpoſition of the air is neceſſary in the hotteſt climates, either to cauſe ſo exalted a corruption of the fore-mentioned ſubſtances, or at leaſt to enforce upon men's bodies the action of the effluvia exhaled from thoſe ſubſtances, while they putrefy. Both which effects may well be expected from the ſenſible ill qualities of the air before deſcribed, whenever they continue and exert their force together any conſiderable time.

What I have here advanced of the firſt original of the Plague, appears to me ſo reaſonable, that I cannot enough wonder at authors for quitting the conſideration of ſuch manifeſt cauſes for hidden qualities; ſuch as malignant influences of the heavens: arſenical, bituminous, or other mineral effluvia, with the like imaginary or uncertain agents.

This however I do not ſay with deſign abſolutely to exclude all diſorders in the air, that are more latent than the intemperate heat and moiſture before-mentioned, from a ſhare in increaſing and promoting the infection of the Plague, where it is once bred: for I rather think this muſt ſometimes be the caſe; like to what is obſerved among us in relation to another infectious diſtemper, namely, the ſmall-pox, which is moſt commonly ſpread, and propagated by the ſame manifeſt qualities of the air, as thoſe here deſcribed: notwithſtanding which, this diſtemper is ſometimes known to rage with great violence in the very oppoſite conſtitution of air, *viz.* in the winter during dry and froſty weather. But to breed a diſtemper, and to give force to it when bred, are two different things. And though we ſhould allow any ſuch ſecret change in the air to aſſiſt in the firſt production of the diſeaſe; yet it may juſtly be cenſured in theſe writers, that they ſhould undertake to determine the ſpecifick nature of theſe ſecret changes and alterations, which we have no means at all of diſcovering: ſince they do not ſhew themſelves in any ſuch ſenſible manner, as to come directly under our examination; nor yet do their effects, in producing the Plague, point out any thing of their ſpecifick nature.

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[1] Cicero de Nat. Deor. lib. i. § 36. ſpeaking of theſe birds, ſays: *Avertunt Peſtem ab Ægypto, cum volucres angues ex vaſtitate Libyæ vento Africo invectas interficiunt atque conſumunt; ex quo fit ut illæ nec morſu vivæ noceant, nec odore mortuæ.*

All that we know is this, that the cauſe of the Plague, whatever it be, is of ſuch a nature, that when taken into the body, it works ſuch changes in the blood and juices, as to produce this diſeaſe, by ſuddenly giving ſome parts of the humours ſuch corroſive qualities, that they either excite inward inflammations and gangrenes, or puſh out carbuncles and buboes; the matter of which, when ſuppurated, communicates the like diſeaſe to others: but of the manner how this is done, I ſhall diſcourſe in the following chapter.

CHAP. II.

Of the cauſes which ſpread the Plague.

I Have been thus particular in tracing the Plague up to its firſt origin, in order to remove, as much as poſſible, all objection againſt what I ſhall ſay of the cauſes, which excite and propagate it among us. This is done by contagion. Thoſe who are ſtrangers to the full power of this, that is, thoſe who do not underſtand how ſubtile it is, and how widely the diſtemper may be ſpread by infection, aſcribe the riſe of it wholly to the malignant quality of the air in all places, wherever it happens; and, on the other hand, ſome have thought that the conſideration of the infectious nature of the diſeaſe muſt exclude all regard to the influence of the air: whereas the contagion accompanying the diſeaſe, and the diſpoſition of the air to promote that contagion, ought equally to be conſidered; both being neceſſary to give the diſtemper full force. The deſign therefore of this chapter, is to make a proper ballance between theſe two, and to ſet juſt limits to the effects of each.

For this purpoſe, I ſhall reduce the cauſes, which ſpread the Plague, to three; diſeaſed perſons, goods tranſported from infected places, and a corrupted ſtate of air.

There are ſeveral diſeaſes, which will be communicated from the ſick to others: and this not done after the ſame manner in all. The hydrophobia is communicated no other way than by mixing the morbid juices of the diſeaſed animal immediately with the blood of the ſound, by a bite, or what is analogous thereto; the itch is given by ſimple contact; the lues venerea not without a cloſer contact; but the meaſles, ſmall-pox, and Plague, are caught by a near approach only to the ſick: for in theſe three laſt diſeaſes perſons are rendered obnoxious to them only by reſiding in the ſame houſe, and converſing with the ſick.

Now it appears by the experiments mentioned in the preface, of giving the Plague to dogs by putting the bile, blood or urine from infected perſons, into their veins, that the whole maſs of the animal fluids in this diſeaſe is highly corrupted and putrified. It is therefore eaſy to conceive how the effluvia or fumes from liquors ſo affected may taint the ambient air. And this will more eſpecially happen, when the humours are in the greateſt fermentation, that is, at the heighth of the fever: as it is obſerved that fermenting liquors do at the latter end of their inteſtine motion throw off a great quantity of their moſt ſubtile and active particles. And this diſcharge will be chiefly made upon thoſe glands of the body, in which the ſecretions are the moſt copious, and the moſt eaſily increaſed: ſuch are thoſe of the mouth and ſkin. From theſe therefore the air will be impregnated with peſtiferous atoms: which being taken into the body of a ſound perſon will, in the nature of a ferment, put the fluids there into the like agitation and diſorder.

The body, I ſuppoſe, receives them theſe two ways, by the breath, and by the ſkin; but chiefly by the former.

I think it certain that reſpiration does always communicate to the blood ſome parts from the air: which is proved from this obſervation, that the ſame quantity of air will not ſuffice long for breathing, though it be deprived of none of thoſe qualities, by which it is fitted to inflate the lungs and agitate the blood, the uſes commonly aſcribed to it. And this is farther confirmed by what the learned Dr. Halley has informed me, that when he was ſeveral fathom under water in his diving-engine, and breathing an air much more condenſed than the natural, he obſerved himſelf to breathe more ſlowly than uſual: which makes it more than probable, that this conveying to the blood ſome ſubtile parts from the air, is the chief uſe of reſpiration; ſince when a greater quantity of air than uſual was taken in at a time, and conſequently more of theſe ſubtile parts received at once by the blood, a leſs frequent reſpiration ſufficed.

As to the ſkin, ſince there is a continual diſcharge made through its innumerable pores, of the matter of inſenſible perſpiration and ſweat; it is very poſſible that the ſame paſſages may admit ſubtle corpuſcles, which may penetrate into the inward parts. Nay it is very plain that they do ſo, from what we obſerve upon the outward application of ointments and warm bathings: which have their effects by their fineſt and moſt active parts inſinuating themſelves into the blood.

It is commonly thought, that the blood only is affected in theſe caſes by the morbifick effluvia. But I am of opinion, that there is another fluid in the body, which is, eſpecially in the beginning, equally, if not more concerned in this affair: I mean the liquid of the nerves, uſually called the animal ſpirits. As this is the immediate inſtrument of all motion and ſenſation, and has a great agency in all the glandular ſecretions, and in the circulation of the blood itſelf; any conſiderable alteration made in it muſt be attended with dangerous conſequences. It is not poſſible that the whole maſs of blood ſhould be corrupted in ſo ſhort a time as that, in which the fatal ſymptoms, in ſome caſes, diſcover themſelves. Thoſe patients of the firſt claſs, mentioned in the beginning of this diſcourſe, particularly the porters who opened the infected bales of goods in the lazaretto's of Marſeilles, died upon the firſt appearance of infection, as it were by a ſudden ſtroke; being ſeized with rigours, tremblings, heart-ſickneſs, vomitings, giddineſs and heavineſs of the head, an univerſal languor and inquietude; the pulſe low and unequal: and death enſued ſometimes in a few hours.

Effects ſo ſudden muſt be owing to the action of ſome corpuſcles of great force inſinuated into, and changing the properties of, another ſubtile and active fluid in the body; and ſuch an one, no doubt, is the nervous liquor.

It is not to be expected that we ſhould be able to explain the particular manner by which this is brought about. We know too little of the frame of the univerſe, and of the laws of attractions, repulſions and coheſions among the minuteſt parcels of matter, to be able to determine all the ways by which they affect one another, eſpecially within animal bodies,

dies, the moſt delicate and complicated of all the known works of nature. But we may perhaps make a probable conjecture upon the matter. Our great philoſopher, whoſe ſurprizing diſcoveries have exceeded the utmoſt expectations of the moſt penetrating minds, has demonſtrated that there is diffuſed through the univerſe a ſubtile and elaſtick fluid of great force and activity. This he ſuppoſes to be the cauſe of the refraction and reflection of the rays of light; and that by its vibrations light communicates heat to bodies: and, moreover, that this readily pervading all bodies, produces many of their effects upon one another [a].

Now it is not improbable that the animal ſpirits are a thin liquor, ſeparated in the brain. and from thence derived into the nerves, of ſuch a nature that it admits, and has incorporated with it, a great quantity of this elaſtick fluid: which makes it a vital ſubſtance of great energy. And a liquor of this kind muſt be very ſuſceptible of alterations from other active bodies of a different nature from it, if they approach to and are mixed with it: as we ſee ſome chemical ſpirits upon their being put together, fall into a fermentation, and make a compoſition of a quite different kind.

If therefore we allow the effluvia or exhalations from a corrupted maſs of humours in a body that has the Plague to be volatile and fiery particles, carrying with them the qualities, of thoſe fermenting juices from which they proceed; it will not be hard to conceive how theſe may, when received into the nervous fluid of a ſound perſon, excite in it ſuch inteſtine motions as may make it to partake of their own properties, and become more unfit for the purpoſes of the animal œconomy. But of this more in another place.

This is one means by which the Plague, when once bred, is ſpread and increaſed: but the ſecond of the forementioned cauſes, namely, goods from infected places, extends the miſchief much wider. By the preceding cauſe, the Plague may be ſpread from perſon to perſon, from houſe to houſe, or perhaps from town to town, though not to any great diſtance; but this carries it into the remoteſt regions. From hence the trading parts of Europe have their principal apprehenſions, and univerſally have recourſe to quarantaines for their ſecurity. The univerſality of which practice is a ſtrong argument, that merchandize will communicate infection: for one cannot imagine, that ſo many countries ſhould agree in ſuch a cuſtom without the moſt weighty reaſons. But beſides, there is not wanting expreſs proof of this, from particular examples, where this injury has been done by ſeveral ſorts of goods carried from infected places to others. Some of theſe I ſhall hereafter be obliged to mention; at preſent I ſhall confine myſelf to three inſtances only. The firſt ſhall be of the entrance of the Plague into Rome in the year 1656, which we are aſſured was conveyed thither from Naples by clothes and other wares from that place, brought firſt to port Neptuno, and carried from thence to the neighbouring caſtle of St. Lawrence: which after having been kept ſome time there, were conveyed into Rome [b]. The ſecond inſtance I ſhall take, is from the account given us of the entrance of the Plague into Marſeilles [c]; which being drawn up with great exactneſs may be the more relied on. It appears indiſputably by this account, that the miſchief was brought thither by goods from the Levant. For the firſt, who had the diſtemper, was one of the crew of the ſhip, which brought thoſe goods: the next were thoſe, who attended upon the ſame goods, while they were under quarantaine; and ſoon after the ſurgeon, whom the magiſtrates of Marſeilles appointed to examine the bodies of thoſe who died.

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[a] Newton's Opticks, Qu. 18 to 24.

This relation, if duly conſidered, is, I believe, ſufficient to remove all the doubts any one can have about the power of merchandize to convey infection: for it affords all the evidence, the moſt ſcrupulous can reaſonably deſire. Poſſibly there might be ſome fever of extraordinary malignity in Marſeilles, ſuch as is commonly called peſtilential, before the arrival of theſe goods: but no ſuch fever has any diſputable right to the title of peſtilence, as I have before ſhewn. On the contrary, theſe two, the real peſtilence, and ſuch peſtilential fevers, muſt carefully be diſtinguiſhed, if we deſign to avoid all miſtakes in reaſoning upon theſe ſubjects.

Some ſuch fever of uncommon malignity, I ſay, might perhaps be in Marſeilles before the Arrival of theſe goods. There might likewiſe perhaps be an inſtance or two of fevers attended with eruptions, bearing ſome reſemblance to thoſe of the Plague: for ſuch I myſelf have ſometimes ſeen here in London. But it is not conceivable, that there ſhould be any appearance of the true Plague before that time: for it was full ſix weeks from the time of the ſailor's death, which had given the alarm, and raiſed a general attention, before the magiſtrates received information of any one's dying of the Plague in the city. And I believe it was never known, that the Plague, being once broke out, gave ſo long a truce in hot weather.

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[b] Gaſtaldi, de Peſte, p. 116.

[c] Journal de ce qui s'eſt paſſé à Marſeilles, &c.

The Plague, which has this preſent year almoſt depopulated Meſſina, affords a third inſtance of the ſame kind. By an authentick relation of it, publiſhed here [d] we are informed, that a Genoeſe veſſel from the Levant, arrived at that city; and upon notice given that a ſailor, who had touched ſome caſes of cotton ſtuffs bought up at Patraſſo in the Morea, where the diſtemper then raged, was dead of the Plague, in the voyage; the ſhip was put under quarantaine: during which time the cotton ſtuffs were privately landed. The maſter and ſome ſailors dying three days after, the veſſel was burnt. Theſe goods lay for ſome time concealed, but were ſoon after publickly ſold: upon which the diſeaſe immediately broke out in that quarter where they were opened; and afterwards was ſpread through the whole city.

I think it not improper, for the fuller confirmation of the preſent point, to give a relation communicated to me by a perſon of unqueſtionable credit, of the like effect from goods, in reſpect to the ſmall-pox; which diſtemper is frequently carried in the nature of the Plague both to the Eaſt and Weſt-Indies from theſe countries, and was once carried from the Eaſt-Indies to the Cape of Good Hope, in the following manner. About the year 1718, a ſhip from the Eaſt-Indies arrived at that place: in the voyage three children had been ſick of the ſmall-pox: the foul linen uſed about them was put into a trunk, and locked up. At the ſhip's landing, this was taken out, and given to ſome of the natives to be waſhed: upon handling the linen, they were immediately ſeized with the ſmall-pox, which ſpread into the country for many miles, and made ſuch a deſolation, that it was almoſt diſpeopled.

It has been thought ſo difficult to explain the manner how goods retain the ſeeds of contagion, that ſome [e] authors have imagined infection to be performed by the means of inſects; the eggs of which may be conveyed from place to place, and make the diſeaſe when they come to be hatched. But as this is a ſuppoſition grounded upon no manner of obſervation, ſo I think there is no need to have recourſe to it. If, as we have conjectured, the matter of contagion be an active ſubſtance generated chiefly from animal corruption; it is not hard to conceive how this may be lodged and preſerved in ſoft porous bodies, which are kept preſſed cloſe together.

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[d] Vid. The London Gazette, July 23, 1743.

[e] Kircher, Langius, &c.

We all know how long a time perfumes hold their ſcent, if wrapt up in proper coverings; and it is very remarkable, that the ſtrongeſt of theſe, like the matter we are treating of, are moſtly animal juices, as muſk, civet, &c. and that the ſubſtances, found moſt fit to keep them in, are the very ſame with thoſe, which are moſt apt to receive and communicate infection, as furrs, feathers, ſilk, hair, wool, cotton, flax, &c. the greateſt part of which are likewiſe of the animal kind.

Nothing indeed can give us ſo juſt a notion of infection, and more clearly repreſent the manner of it, than odoriferous bodies. Some of theſe do ſtrangely revive the animal ſpirits; others inſtantaneouſly depreſs and ſink them: we may therefore conceive that, what active particles emitted from any ſuch ſubſtances do, is in the like way done by peſtiferous bodies; ſo that contagion is no more than the effect of volatile offenſive matter drawn into the body by our ſmelling.

The third cauſe we aſſigned for the ſpreading of contagion, was a corrupted ſtate of air. Although the air be in a right ſtate, yet a ſick perſon may infect thoſe who are very near him: as we find the peſtilence to continue ſometimes among the crew of a ſhip, after they have ſailed out of the infectious air wherein the diſeaſe was firſt caught. A remarkable accident of this nature is recorded to have happened in the Plague at Genoa in the year 1656. Eleven perſons put to ſea in a felucca, with deſign to withdraw themſelves from the contagion, and retire into Provence; but one of them falling ſick of the Plague ſoon after they had imbarked, infected the reſt; inſomuch that others being taken ill, and dying in their turns, they were not admitted any where, but were forced to return from whence they came: and by that time the boat arrived again at Genoa no more than one of them ſurvived[f].

However in this caſe the malady does not uſually ſpread far, the contagious particles being ſoon diſperſed and loſt. But when in a corrupt diſpoſition of the air the contagious particles meet with the ſubtile parts generated by that corruption, by uniting with them they become much more active and powerful, and likewiſe of a more durable nature: ſo as to form an infectious matter capable of conveying the miſchief to a greater diſtance from the diſeaſed body, out of which it was produced.

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[f] Toulon, Traité de la Peſte.

In general, a hot air is more diſpoſed to ſpread contagion than a cold one, as no one can doubt, who conſiders how much all kinds of effluvia are farther diffuſed in a warm air, than in the contrary. But moreover, that ſtate of air, when unſeaſonable moiſture and want of winds are added to its heat, which gives birth to the Plague in ſome countries, will doubtleſs promote it in all. For Hippocrates ſets down the ſame deſcription of a peſtilential ſtate of air in his country, as the Arabians do of the conſtitution, which gives riſe to the Plague in Africa[g]. Mercurialis aſſures us the ſame conſtitution of air attended the peſtilence in his time at Padua[h]: and Gaſſendus obſerved the ſame in the Plague of Digne[i]. Beſides, it is eaſy to ſhew how the air, by the ſenſible ill qualities diſcourſed of in the laſt chapter, ſhould favour infectious diſeaſes, by rendering the body obnoxious to them.

Indeed other hurtful qualities of the air are more to be regarded than its heat alone: for the Plague is ſometimes ſtopt, while the heat of the ſeaſon increaſes, upon the emendation of the air in other reſpects. At Smyrna the Plague, which is yearly, carried thither by ſhips, conſtantly ceaſes about the 24th of June, by the dry and clear weather they always have at that time: the unwholeſome damps being then diſſipated that annoy the country in the ſpring. However, the heat of the air is of ſo much conſequence, that if any ſhip brings it in the winter months of November, December, January, or February, it never ſpreads; but if later in the year, as in April or afterwards, it continues till the time before-mentioned.

But moreover, what was ſaid before of ſome latent diſorders in the air having a ſhare in ſpreading the Plague, will likewiſe have place in theſe countries; as the laſt Plague in the city of London remarkably proves, the ſeeds of which, upon its firſt entrance, and while it was confined to a houſe or two, preſerved themſelves through a hard froſty winter, and again put forth their malignant quality as ſoon as the warmth of the ſpring gave them force: but, at the latter end of the next winter they were ſuppreſſed ſo as to appear no more, though in the month of December more than half the pariſhes of the city were infected.

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[g] Hippocr. Epid. l. iii. That Hippocrates deſcribes here the conſtitution of air accompanying the true Plague, contrary to what ſome have thought, Galen teſtifies in his comment upon this place, in libr. De Temper. l. i. c. 4. and in lib. De differentiis Febr. lib. i. c. 4. [h] Vid. Mercurial. Prælect. De Peſtilent. [i] Notitia Eccleſ. Dinienſis.

A corrupted ſtate of air is, without doubt, neceſſary to give theſe contagious atoms their full force; for otherwiſe it were not eaſy to conceive how the Plague, when once it had ſeized any place, ſhould ever ceaſe but with the deſtruction of all the inhabitants: which is readily accounted for by ſuppoſing an emendation of the qualities of the air, and the reſtoring of it to a healthful ſtate capable of diſſipating and ſuppreſſing the malignity.

On the other hand, it does not appear, that the air, however corrupted, is uſually capable of carrying infection to a very great diſtance; but that commonly the Plague is ſpread from town to town by infected perſons and goods: for there are numberleſs inſtances, where the Plague has cauſed a great mortality in town, while other towns and villages, very near them, have been entirely free. And hence it is, that the Plague ſometimes ſpreads from place to place very irregularly. Thuanus [k] ſpeaks of a Plague in Italy, which one year was at Trent and Verona, the next got into Venice and Padua, leaving Vicenza, an intermediate place, untouched, though the next year that alſo felt the ſame ſtroke: a certain proof that the Plague was not carried by the air from Verona to Padua and Venice; for the infected air muſt have tainted all in its paſſage. We have had lately in France one inſtance of the ſame nature, when the Plague was carried at once out of Provence ſeveral leagues into the Gevaudan. Uſually indeed the Plague, eſpecially when more violent than ordinary, ſpreads from infected places into thoſe which border upon them: which probably is ſometimes effected by ſome little communication infected towns are obliged to hold with the country about them for the ſake of neceſſaries, the ſubtilety of the venom now and then eluding the greateſt precautions; and at other times by ſuch as withdraw themſelves from infected places into the neighbourhood.

I own it cannot be demonſtrated, that when the Plague makes great ravage in any town, the number of ſick ſhall never be great enough to load the air with infectious effluvia, emitted from them in ſuch plenty, that they may be conveyed by the winds into a neighbouring town or village without being diſperſed ſo much as to hinder their producing any ill effects; eſpecially ſince it is not unuſual for the air to be ſo far charged with theſe noxious atoms, as to leave no place within the infected town ſecure: inſomuch that when the diſtemper is at its heighth, all ſhall be indifferently infected, as well thoſe

[k] Hiſtor. lib. lxii.

who keep from the ſick, as thoſe who are near them; though at the beginning of a Plague to avoid all communication with the diſeaſed, is an effectual defence. However, I do not think this is often the caſe: juſt as the ſmoke, with which the air of the city of London is conſtantly impregnated, eſpecially in winter, is not carried many miles diſtant; though the quantity of it is vaſtly greater than the quantity of infectious effluvia, that the moſt mortal Plague could generate.

But, to conclude what relates to the air, ſince the ill qualities of it in theſe northern countries are not alone ſufficient to excite the Plague, without imported contagion, this ſhews the error of a common opinion, countenanced by authors of great name[1], that we are neceſſarily viſited with the Plague once in thirty or forty years: which is a mere fancy, without foundation either in reaſon or experience; and therefore people ought to be delivered from ſuch vain fears. Since the peſtilence is never originally bred with us, but always brought accidentally from abroad, its coming can have no relation to any certain period of time. And although our three or four laſt Plagues have fallen out nearly at ſuch intervals, yet that is much too ſhort a compaſs of years to be a foundation for a general rule. Accordingly we ſee that almoſt fourſcore years have paſſed over without any calamity of this kind.

The air of our climate is ſo far from being ever the original of the true Plague, that moſt probably it never produces thoſe milder infectious diſtempers, the ſmall-pox and meaſles. For theſe diſeaſes were not heard of in Europe before the Moors had entered Spain: and (as I have obſerved in the preface) they were afterwards propagated and ſpread through all nations, chiefly by means of the wars with the Saracens.

Moreover, we are ſo far from any neceſſity of theſe periodical returns of the Plague, that, on the contrary, though we have had ſeveral ſtrokes of this kind, yet there are inſtances of bad contagions from abroad being brought over to us, which have proved leſs malignant here, when our northern air has not been diſpoſed to receive ſuch impreſſions.

The ſweating ſickneſs, before hinted at, called Sudor Anglicus and Febris Ephemera Britannica, becauſe it was commonly thought to have taken its riſe here, was moſt probably of a foreign original: and though not the common Plague with glandular tumors, and carbuncles, yet a real peſtilence from the ſame cauſe, only altered in its appearance, and abated in its violence, by the ſalutary influence of our climate. For it preſerved an agreement with the common Plague in many of its ſymptoms, as exceſſive faintneſs and inquietudes, inward burnings, &c. theſe ſymptoms being no where obſerved in ſo intenſe a degree as here they are deſcribed to have been, except in the true Plague: and, what is much more, it was likewiſe a contagious diſeaſe.

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[1] Sydenham de Peſte.

The firſt time this was felt here, which was in the year 1485, it began in the army, with which king Henry VII. came from France and landed in Wales[m]: and it has been ſuppoſed by ſome to have been brought from the famous ſiege of Rhodes by the Turks three or four years before, as may be collected from what Dr. Keyes ſays in one place of his treatiſe on this diſeaſe[n]. Beſides, of the ſeveral returns which this has made ſince that time, viz. in the years 1506, 1517, 1528, and 1551, that in the year 1528 may very juſtly be ſuſpected to have been owing to the common peſtilence, which at thoſe times raged in Italy[o], as I find one of our hiſtorians has long ago conjectured[p]: and the others were very probably from a Turkiſh infection. If at leaſt ſome of theſe returns were not owing to the remains of former attacks, a ſuitable conſtitution of air returning to put the latent ſeeds in action before they were quite deſtroyed. It is the more probable that this diſeaſe was owing to imported contagion; becauſe we are aſſured, that this form of the ſickneſs was not peculiar to our iſland, but that it made great deſtruction with the ſame ſymptoms in Germany, and other countries[q].

I call this diſtemper a Plague with leſſened force: becauſe though its carrying off thouſands for want of right management was a proof of its malignity, which indeed in one reſpect exceeded that of the common Plague itſelf (for few, who were deſtroyed with it, ſurvived the ſeizure above one natural day) yet its going off ſafely with profuſe ſweats in twenty four hours, when due care was taken to promote that evacuation, ſhewed it to be what a learned and wiſe hiſtorian calls it, rather a ſurprize to nature, than obſtinate to remedies; who aſſigns this reaſon for expreſſing himſelf thus, that if the patient was kept warm with temperate cordials, he commonly recovered[r]. And, what I think yet more remarkable, ſweating, which was the natural criſis of this diſtemper, has been found by great phyſicians the beſt remedy againſt the common plague: by which means, when timely uſed, that diſtemper may ſometimes be carried off without any external tumors. Nay beſides, a judicious obſerver informs us, that in many of his patients, when he had broken the violence of the diſtemper by ſuch an artificial ſweat, a natural ſweat not excited by medicines would break forth exceedingly refreſhing [s].

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[m] Vid. Caium, De Febr. Ephemer. Britan. and Lord Bacon's Hiſtory of Henry VII. [n] Pag. 162. Edit. Lovan. [o] Vid. Rondinelli Contagio in Firenze, & Summonte Hiſtor. di Napoli. [p] Lord Herbert's Hiſtory of Henry VIII. [q] Thuani Hiſtor. lib. v. [r] Lord Verulam's Hiſtory of Henry VII.

And I cannot but take notice, as a confirmation of what I have been advancing, that we had here the ſame kind of fever in the year 1713, about the month of September, which was called the Dunkirk fever, as being brought by our ſoldiers from that place. This probably had its original from the Plague, which a few years before broke out at Dantzick, and continued ſome time among the cities of the north. With us this fever began only with a pain in the head, and went off in large ſweats uſually after a day's confinement: but at Dunkirk it was attended with the additional ſymptoms of vomiting, diarrhœa, &c.

To return from this digreſſion: from all that has been ſaid, it appears, I think, very plainly, that the Plague is a real poiſon, which being bred in the ſouthern parts of the world, is carried by commerce into other countries, particularly into Turkey, where it maintains itſelf by a kind of circulation from perſons to goods: which is chiefly owing to the negligence of the people there, who are ſtupidly careleſs in this affair. That when the conſtitution of the air happens to favour infection, it rages there with great violence: that at that time more eſpecially diſeaſed perſons give it to one another, and from them contagious matter is lodged in goods of a looſe and ſoft texture, which being packed up and carried into other countries, let out when opened, the impriſoned ſeeds of contagion, and produce the diſeaſe whenever the air is diſpoſed to give them force; otherwiſe they may be diſſipated without any conſiderable ill effects. And laſtly, that the air does not uſually diffuſe and ſpread theſe to any great diſtance, if intercourſe and commerce with the place infected be ſtrictly prevented.

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[s] Vide Sydenham, De Peſte, An. 1665.

PART II.

OF THE METHODS TO BE TAKEN AGAINST THE PLAGUE.

CHAP. I.

Of preventing infection from other countries.

AS it is a ſatisfaction to know, that the Plague is not a native of our country, ſo this is likewiſe an encouragement to the utmoſt diligence in finding out means to keep ourſelves clear from it.

This caution conſiſts of two parts: The preventing its being brought into our iſland; and, if ſuch a calamity ſhould happen, the putting a ſtop to its ſpreading among us.

The firſt of theſe is provided for by the eſtabliſhed method of obliging ſhips, that come from infected places, to perform quarantaine: as to which, I think it neceſſary, that the following rules be obſerved.

Near to our ſeveral ports, there ſhould be lazaretto's built in convenient places, on little iſlands, if it can ſo be, for the reception both of men and goods, which arrive from places ſuſpected of infection: the keeping men in quarantaine on board the ſhip being not ſufficient; the only uſe of which is to obſerve whether any die among them. For infection may be preſerved ſo long in clothes, in which it is once lodged, that as much, nay more of it, if ſickneſs continues in the ſhip, may be brought on ſhore at the end than at the beginning of forty days: unleſs a new quarantaine be begun every time any perſon dies; which might not end but with the deſtruction of the whole ſhip's crew.

If there has been any contagious diſtemper in the ſhip; the ſound men ſhould leave their clothes, which ſhould be ſunk in the ſea, the men waſhed and ſhaved, and having freſh clothes, ſhould ſtay in the lazaretto thirty or forty days. The reaſon of this is, becauſe perſons may be recovered from a diſeaſe themſelves, and yet retain matter of infection about them a conſiderable time: as we frequently ſee the ſmall-pox taken from thoſe, who have ſeveral days before paſſed through the diſtemper.

The ſick, if there be any, ſhould be kept in houſes remote from the ſound, and, ſome time after they are well, ſhould alſo be waſhed and ſhaved, and have freſh clothes; whatever they wore while ſick being ſunk or buried: and then being removed to the houſes of the ſound, ſhould continue there thirty or forty days.

I am particularly careful to deſtroy the clothes of the ſick, becauſe they harbour the very quinteſſence of contagion. A very ingenious author[a], in his admirable deſcription of the Plague at Florence in the year 1348, relates what himſelf ſaw: that two hogs finding in the ſtreets the rags, which had been thrown out from off a poor man dead of the diſeaſe, after ſnuffling upon them, and tearing them with their teeth, they fell into convulſions, and died in leſs than an hour. The learned Fracaſtorius acquaints us, that in his time, there being a Plague in Verona, no leſs than twenty five perſons were ſucceſſively killed by the infection of one furr garment[b]. And Foreſtus gives a like inſtance of ſeven children, who died by playing upon clothes brought to Alckmaer in North-Holland, from an infected houſe in Zealand[c]. The late Mr. Williams, chaplain to Sir Robert Sutton, when embaſſador at Conſtantinople, uſed to relate a ſtory of the ſame nature told him by a baſſa: that in an expedition this baſſa made to the frontiers of Poland, one of the janizaries under his command died of the Plague; whoſe jacket, a very rich one, being bought by another janizary, it was no ſooner put on, but he alſo was taken ſick and died: and the ſame misfortune befel five janizaries more, who afterwards wore it. This the baſſa related to Mr. Williams, chiefly for the ſake of this farther circumſtance, that the incidents now mentioned prevailed upon him to order the burning of the garment: deſigning by this inſtance to let Mr. Williams ſee there were Turks, who allowed themſelves in ſo much freedom of thought, as not to pay that ſtrict regard to the Mahometan doctrine of fatality, as the vulgar among them do.

If there has been no ſickneſs in the ſhip, I ſee no reaſon why the men ſhould perform quarantaine. Inſtead of this, they may be waſhed, and their clothes aired in the lazaretto, as goods, for one week.

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[a] Boccaccio Decameron. Giornat. prim.

[b] De Contagione, l. iii. c. 7.

[c] Obſervat. l. vi. Schol. ad Obſerv. 22.

But the greateſt danger is from ſuch goods, as are apt to retain infection, ſuch as cotton, hemp and flax, paper or books, ſilk of all ſorts, linen, wool, feathers, hair, and all kinds of ſkins. The lazaretto for theſe ſhould be at a diſtance from that for the men; and they muſt in convenient warehouſes be unpacked, and expoſed, as much as may be, to the freſh air for forty days.

This may perhaps ſeem too long; but as we do not know how much time preciſely is neceſſary to purge the interſtices of ſpongy ſubſtances from infectious matter by freſh air, the caution cannot be too great in this point. Certainly the time here propoſed, having been long eſtabliſhed by general cuſtom, ought not in the leaſt to be retrenched; unleſs there could be a way found out of trying when bodies have ceaſed to emit the noxious fumes. Poſſibly this might be diſcovered by putting tender animals near to them, particularly little birds: becauſe it has been obſerved in times of the Plague, that the country has been forſaken by the birds; and thoſe kept in houſes have many of them died[d]. Now if it ſhould be found, that birds let looſe among goods at the beginning of their quarantaine, are obnoxious to the contagion in them, it may be known, in good meaſure, when ſuch goods are become clean, by repeating the trial till birds let fly among them receive no hurt. But the uſe of this expedient can be known only by experience. In the mean time, I own I am fond of the thought, in compaſſion to poor labourers, who muſt expoſe their lives to danger, in the attendance upon this work: and though I am well aware that there are Plagues among animals, which do not indifferently affect all kinds of them, ſome being confined to a particular ſpecies, (like the diſeaſe of the black cattle here, a few years ſince, which neither proved infectious to other brutes, nor to men;) yet it has always been obſerved that the true Plague among men has been deſtructive to all creatures of what kind ſoever.

A very remarkable ſtory, lately communicated to me by a perſon of undoubted credit, is too much to the purpoſe to be here omitted. The fact is this. In the year 1726, an Engliſh ſhip took in goods at Grand Cairo, in the time of the Plague's raging there, and carried them to Alexandria. Upon opening one of the bales of wool in a field, two Turks employed in the work were immediately killed: and ſome birds, which happened to fly over the place, dropped down dead.

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[d] Diemerbroeck, De Peſte, l. i. c. 4.

However, the uſe of quarantaines is not wholly fruſtrated by our ignorance of the exact time required for this purification: ſince the quarantaine does at leaſt ſerve as a trial whether goods are infected or not; it being hardly poſſible that every one of thoſe, who are obliged to attend upon them, can eſcape hurt, if they are ſo. And whenever that happens, the goods muſt be deſtroyed.

I take it for granted, that the goods ſhould be opened, when they are put into the lazaretto, otherwiſe their being there will avail nothing. This is the conſtant practice in the ports of Italy. That it is ſo at Leghorn, appears by the account lately publiſhed of the manner in which quarantaines are there performed: and I find, that the ſame rule is obſerved at Venice, from an authentick paper I have before me, containing the methods made uſe of in that city, where quarantaines have been enjoined ever ſince the year 1484; at which time, as far as I can learn, they were firſt inſtituted in Europe. In that place all bales of cotton, of camel's or of beaver's hair, and the like, are ript open from end to end, and holes made in them by the porters every day, into which they thruſt their naked arms, in order that the air may have free acceſs to every part of the goods. That ſome ſuch cautions as theſe ought not to be omitted, is clearly proved by the misfortune, which happened in the iſland of Bermudas about the year 1695; where, as the account was given me by the learned Dr. Halley, a ſack of cotton put on ſhore by ſtealth, lay above a month without any prejudice to the people of the houſe, where it was hid: but when it came to be diſtributed among the inhabitants, it carried ſuch a contagion along with it, that the living ſcarce ſufficed to bury the dead. This relation Dr. Halley received from captain Tucker of Bermudas, brother to Mr. Tucker late under-ſecretary in our ſecretary's office.

Indeed, as it has been frequently experienced, that of all the goods, which harbour infection, cotton in particular is the moſt dangerous, and Turky is almoſt a perpetual ſeminary of the Plague; I cannot but think it highly reaſonable, that whatever cotton is imported from that part of the world, ſhould at all times be kept in quarantaine: becauſe it may have imbibed infection at the time of its packing up, notwithſtanding no miſchief has been felt from it by the ſhip's company. And the length of time from its being packed up to its arrival here, is no certain ſecurity that it is cleared from the infection. At leaſt, it is found, that the time employed by ſhips in paſſing between Turky and Marſeilles, is not long enough for goods to loſe their infection: as appears not only from the late inſtance, but alſo from an obſervation made in a certain memorial, drawn up by the deputy of trade at Marſeilles[e]. Marſeilles is the only port in France allowed to receive goods from the Levant, on account of its ſingular convenience for quarantaines, by reaſon of ſeveral ſmall iſlands ſituated about it. The ports of France in the weſtern ocean having had a deſire to be allowed the ſame liberty, their deputies preſented, in the year 1701, a memorial to the royal council of trade, containing ſeveral reaſons for their pretenſions. To this the deputy at Marſeilles makes reply in the memorial I am ſpeaking of, in which this advantage of Marſeilles for quarantaines above the other ports, is much inſiſted upon: and, to evince the importance thereof, it is declared in expreſs words, that many times perſons have been found in that place to die of the Plague in their attendance upon goods under quarantaine. Now if it be certain, that goods have retained infection during their paſſage from Turky to Marſeilles; it is too hardy a preſumption to be admitted in an affair ſo important as this, that they muſt neceſſarily loſe all contagion in the time of their coming to us, becauſe the voyage is ſomething longer. But beſides this, there are ſome few inſtances of goods, that have retained their infection many years. In particular, Alex. Benedictus gives a very diſtinct relation of a feather-bed, that was laid by ſeven years on ſuſpicion of its being infected, which produced miſchievous effects at the end of that great length of time[f]. And Sir Theodore Mayerne relates, that ſome clothes fouled with blood and matter from Plague ſores being lodged between matting and the wall of a houſe in Paris, gave the Plague ſeveral years after to a workman, who took them out, which preſently ſpread through the city[g].

What makes cotton ſo eminently dangerous, is its great aptitude to imbibe and retain any ſort of effluvia near it; of which I have formerly made a particular experiment, by cauſing ſome cotton to be placed for one day near a piece of putrefying fleſh from an amputated limb, in a bell-glaſs, but without touching it: for the cotton imbibed ſo ſtrong a taint, that being put up in a cloſe box, it retained its offenſive ſcent above ten months, and would, I believe, have kept for years. If, inſtead of the fumes of putrefied fleſh from a ſound body, this cotton had been thus impregnated with the fumes of corrupted matter from one ſick of the Plague; I make no doubt but it would have communicated infection. And the experiment would have ſucceeded alike in both caſes, if inſtead of cotton, ſilk, wool, or hair, had been incloſed in the veſſel: animal ſubſtances being the moſt apt to attract the volatile particles, which come from bodies of the ſame nature with themſelves.

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[e] Memorials preſented by the deputies of the council of trade, in France, to the royal council, pag. 44. and 45.

[f] Alex. Benedict. De Peſte, cap. 3.

[g] In a paper of advice againſt the Plague, laid before the king and council by Sir Theod. Mayerne, in the year 1631. MS.

As all reaſonable proviſions ſhould be made both for the ſound and ſick, who perform quarantaine; ſo the ſtrict keeping of it ought to be inforced by the ſevereſt penalties. And if a ſhip comes from any place, where the Plague raged, at the time of the ſhip's departure from it, with more than uſual violence; it will be the ſecureſt method to ſink all the goods, and even the ſhip ſometimes: eſpecially if any on board have died of the diſeaſe.

Nor ought this further caution to be omitted, that when the contagion has ceaſed in any place by the approach of winter, it will not be ſafe to open a free trade with it too ſoon: becauſe there are inſtances of the diſtemper's being ſtopt by the winter cold, and yet the ſeeds of it not deſtroyed, but only kept unactive, till the warmth of the following ſpring has given them new life and force. Thus in the great Plague at Genoa about four-ſcore years ago, which continued part of two years; the firſt ſummer about ten thouſand died; the winter following hardly any; but the ſummer after no leſs than ſixty thouſand. Likewiſe the laſt Plague at London appeared the latter end of the year 1664, and was ſtopt during the winter by a hard froſt of near three months continuance; ſo that there remained no farther appearance of it till the enſuing ſpring[h]. Now if goods brought from ſuch a place ſhould retain any of the latent contagion, there will be danger of their producing the ſame miſchief in the place to which they are brought, as they would have cauſed in that from whence they came.

But above all, it is neceſſary, that the clandeſtine importing of goods be puniſhed with the utmoſt rigour; from which wicked practice I ſhould always apprehend more danger of bringing the diſeaſe than by any other way whatſoever.

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[h] Hodges, De Peſte.

Theſe are, I think, the moſt material points, to which regard is to be had in defending ourſelves againſt contagion from other countries. The particular manner of putting theſe directions in execution, as the viſiting of ſhips, regulation of lazaretto's, &c. I leave to proper officers, who ought ſometimes to be aſſiſted herein by able phyſicians.

CHAP. II.

Of ſtopping the progreſs of the Plague, if it ſhould enter our country.

THE next conſideration is, what to do in caſe, through a miſcarriage in the publick care, by the neglect of officers, or otherwiſe, ſuch a calamity ſhould be ſuffered to befal us.

There is no evil in the world, in which the great rule of reſiſting the beginning, more properly takes place, than in the preſent caſe; and yet it has unfortunately happened, that the common ſteps formerly taken have had a direct tendency to hinder the putting this maxim in practice.

As the Plague always breaks out in ſome particular place, it is certain, that the directions of the civil magiſtrate ought to be ſuch, as to make it as much for the intereſt of infected families to diſcover their misfortune, as it is, when a houſe is on fire, to call in the aſſiſtance of the neighbourhood: whereas, on the contrary, the methods taken by the publick, on ſuch occaſions, have always had the appearance of a ſevere diſcipline, and even puniſhment, rather than of a compaſſionate care; which muſt naturally make the infected conceal the diſeaſe as long as was poſſible.

The main import of the orders iſſued out at theſe times was[1]; As ſoon as it was found, that any houſe was infected, to keep it ſhut up, with a large red croſs, and theſe words, Lord, have mercy upon us, painted on the door; watchmen attending day and night to prevent any one's going in or out, except ſuch phyſicians, ſurgeons, apothecaries, nurſes, ſearchers,

[1] Vid. Directions for the cure of the Plague, by the college of phyſicians; and orders by the lord mayor and aldermen of London, publiſhed 1665.

ers, &c. as were allowed by authority: and this to continue at leaſt a month after all the family was dead or recovered.

It is not eaſy to conceive a more diſmal ſcene of miſery than this: families locked up from all their acquaintance, though ſeized with a diſtemper which the moſt of any in the world requires comfort and aſſiſtance; abandoned it may be to the treatment of an inhumane nurſe (for ſuch are often found at theſe times about the ſick;) and ſtrangers to every thing but the melancholy ſight of the progreſs death makes among themſelves: with ſmall hopes of life left to the ſurvivors, and thoſe mixed with anxiety and doubt, whether it be not better to die, than to prolong a miſerable being, after the loſs of their beſt friends and neareſt relations.

If fear, deſpair, and all dejection of ſpirits, diſpoſe the body to receive contagion, and give it a great power, where it is received, as all phyſicians agree they do; I do not ſee how a diſeaſe can be more inforced than by ſuch a treatment.

Nothing can juſtify ſuch cruelty, but the plea, that it is for the good of the whole community, and prevents the ſpreading of infection. But this upon due conſideration will be found quite otherwiſe: for while contagion is kept nurſed up in a houſe, and continually encreaſed by the daily conqueſts it makes, it is impoſſible but the air ſhould become tainted in ſo eminent a degree, as to ſpread the infection into the neighbourhood upon the firſt outlet. The ſhutting up houſes in this manner is only keeping ſo many ſeminaries of contagion, ſooner or later to be diſperſed abroad: for the waiting a month, or longer, from the death of the laſt patient, will avail no more than keeping a bale of infected goods unpacked; the poiſon will fly out, whenever the Pandora's box is opened.

As theſe meaſures were owing to the ignorance of the true nature of contagion, ſo they did, I firmly believe, contribute very much to the long continuance of the Plague, every time they have been practiſed in this city: and no doubt, they have had as ill effects in other countries.

It is therefore no wonder, that grievous complaints were often made againſt this unreaſonable uſage; and that the citizens were all along under the greateſt apprehenſions of being thus ſhut up. This occaſioned their concealing the diſeaſe as long as they could, which contributed very much to the enforcing and ſpreading of it: and when they were confined, it often happened that they broke out of their impriſonment, either by getting out at windows, &c. or by bribing the watchmen at their doors; and ſometimes even by murdering them. Hence in the nights, people were often met running about the ſtreets, with hideous ſhrieks of horror and deſpair, quite diſtracted, either from the violence of the fever, or from the terrors of mind, into which they were thrown by the daily deaths they ſaw of their neareſt relations.

In theſe miſerable circumſtances, many ran away, and when they had eſcaped, either went to their friends in the country, or built hutts or tents for themſelves in the open fields, or got on board ſhips lying in the river. A few alſo were ſaved by keeping their houſes cloſe from all communication with their neighbours [k].

And it muſt be obſerved, that whenever popular clamours prevailed ſo far, as to procure ſome releaſe for the ſick, this was remarkably followed with an abatement of the diſeaſe. The Plague, in the year 1636, began with great violence; but leave being given by the king's authority for people to quit their houſes, it was obſerved, that not one in twenty of the well perſons removed fell ſick, nor one in ten of the ſick died [l]. Which ſingle inſtance alone, had there been no other, ſhould have been of weight ever after to have determined the magiſtracy againſt too ſtrict confinements. But beſides this, a preceding Plague, viz. in the year 1625, affords us another inſtance of a very remarkable decreaſe upon the diſcontinuing to ſhut up houſes. It was indeed ſo late in the year, before this was done, that the near approach of winter was doubtleſs one reaſon for the diminution of the diſeaſe, which followed: yet this was ſo very great, that it is at leaſt paſt diſpute, that the liberty then permitted was no impediment to it. For this opening of the houſes was allowed of in the beginning of September: and whereas the laſt week in Auguſt, there died no leſs than four thouſand two hundred and eighteen, the very next week the burials were diminiſhed to three thouſand three hundred and forty four; and in no longer time than to the fourth week after, to eight hundred and fifty two [m].

Since therefore the management in former times neither anſwers the purpoſe of diſcovering the beginning of the infection, nor of putting a ſtop to it when diſcovered, other meaſures are certainly to be taken; which, I think, ſhould be of this nature.

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[k] Vid. a Journal of the Plague in 1665, by a citizen. London, 1722.

[l] Diſcourſe upon the Air, by Tho. Cock.

[m] Vid. The ſhutting up houſes ſoberly debated, Anno 1665.

There ought, in the firſt place, a council of health to be eſtabliſhed, conſiſting of ſome of the principal officers of ſtate, both eccleſiaſtical and civil, ſome of the chief magiſtrates of the city, two or three phyſicians, &c. And this council ſhould be intruſted with ſuch powers, as might enable them to ſee all their orders executed with impartial juſtice, and that no unneceſſary hardſhips, under any pretence whatever, be put upon any by the officers they employ.

Inſtead of ignorant old women, who are generally appointed ſearchers in pariſhes to inquire what diſeaſes people die of, that office ſhould be committed to underſtanding and diligent men: whoſe buſineſs it ſhould be, as ſoon as they find any have died after an uncommon manner, particularly with livid ſpots, bubo's, or carbuncles, to give notice thereof to the council of health; who ſhould immediately ſend ſkilful phyſicians to examine the ſuſpected bodies, and to viſit the houſes in the neighbourhood, eſpecially of the poorer ſort, among whom this evil generally begins. And if upon their report it appears, that a peſtilential diſtemper is broken out, they ſhould without delay order all the families, in which the ſickneſs is, to be removed; the ſick to different places from the ſound: but the houſes for both ſhould be three or four miles out of town; and the ſound people ſhould be ſtript of all their clothes, and waſhed and ſhaved, before they go into their new lodgings. Theſe removals ought to be made in the night, when the ſtreets are clear of people: which will prevent all danger of ſpreading the infection. And beſides, all poſſible care ſhould be taken to provide ſuch means of conveyance for the ſick, that they may receive no injury.

As this management is neceſſary with reſpect to the poor and meaner ſort of people; ſo the rich, who have conveniences, may, inſtead of being carried to lazaretto's, be obliged to go to their country houſes: provided that care be always taken to keep the ſound ſeparated from the infected. And at the ſame time all the inhabitants who are yet well, ſhould be permitted, nay encouraged to leave the town, which, the thinner it is, will be the more healthy.

No manner of compaſſion and care ſhould be wanting to the diſeaſed; to whom, when lodged in clean and airy habitations, there would, with due cautions, be no great danger in giving attendance. All expences ſhould be paid by the publick, and no charges ought to be thought great, which are counterbalanced with the ſaving a nation from the greateſt of calamities. Nor does it ſeem to me at all unreaſonable, that a reward ſhould be given to the perſon, that makes the firſt diſcovery of infection in any place: ſince it is undeniable, that the making known the evil to thoſe, who are provided with proper methods againſt it, is the firſt and main ſtep towards the overcoming it.

Although the methods taken in other countries, as well as in our own, have generally been different from what we have here recommended; yet there are not wanting ſome inſtances of extraordinary ſucceſs attending theſe meaſures, whenever they have happened to be put in practice.

The magiſtrates of the city of Ferrara in Italy in the year 1630, when all the country round about them was infected with the Plague, obſerving the ill ſucceſs of the conduct of their neighbours, who, for fear of loſing their commerce, did all they could to conceal the diſeaſe, by keeping the ſick in their houſes, reſolved, whenever occaſion ſhould require, to take a different method. Accordingly, as ſoon as they received information, that one had died in their city of the peſtilence, they immediately removed the whole family he belonged to into a lazaretto, where all, being ſeven in number, likewiſe died. But though the diſeaſe was thus malignant, it went no farther, being ſuppreſſed at once by this method. Within the ſpace of a year the ſame caſe returned ſeven or eight times, and this management as often put a ſtop to it. The example of this city was afterwards followed more than once by ſome other towns in the ſame territory with ſo good ſucceſs, that it was thought expedient, for the common good, to publiſh in the Memoirs of the people of Ferrara, this declaration: That the only remedy againſt the Plague is to make the moſt early diſcovery of it, that is poſſible, and thus to extinguiſh it in the very beginning [n].

No leſs remarkable than this occurrence at Ferrara, is what happened at Rome in the Plague, I have taken notice of before, in the year 1657. When the diſeaſe had ſpread itſelf among both rich and poor, and raged in the moſt violent manner; the pope appointed cardinal Gaſtaldi, to be commiſſary-general of health, giving him for a time the power of the whole ſacred college, with full commiſſion to do whatever he ſhould judge neceſſary. Hereupon he gave ſtrict orders, that no ſick or ſuſpected perſons ſhould ſtay in their own houſes. The ſick he removed, upon the firſt notice, to a lazaretto in the iſland of the Tyber; and all who were in the ſame houſes with them to other hoſpitals juſt without the city, in order to be ſent to the iſland, if they ſhould fall ſick. At the ſame time he took diligent care to ſend away their goods to an airy place to be cleanſed. He executed theſe regulations with ſo much ſtrictneſs, that no perſons of the higheſt quality were exempted from this treatment; which occaſioned at firſt great complaints againſt the cardinal for his ſeverity; but ſoon after he had general thanks: for in two months time, by this means, he entirely cleared the city of the peſtilence, which had continued in it almoſt two years. And it was particularly obſerved, that whereas before, when once the diſeaſe had got into a houſe, it ſeldom ended without ſeizing the whole family; in this management ſcarce five out of an hundred of the ſound perſons removed were infected [o]

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[n] Muratori governo della Peſte, lib. i. c. 5.

I cannot but take notice, that the Plague was ſtopped at Marſeilles a full fortnight by the ſame meaſures, and probably might have been wholly extinguiſhed, had not new force been given it by the unſeaſonable confidence of the inhabitants upon this intermiſſion: which, we are informed, was ſo great, that they would not believe the peſtilence had been at all among them, and publickly upbraided the phyſicians and ſurgeons for frighting them cauſleſly [p]. At this time, no doubt, they muſt have neglected the cautions neceſſary for their ſecurity ſo much, as to leave us no room to be ſurprized, that the diſeaſe ſhould after this break out again with too great violence to be a ſecond time overcome.

But, beſides theſe examples in foreign countries, we have one inſtance of the ſame nature nearer home. When the Plague was laſt here in England, upon its firſt entrance into Poole in Dorſetſhire, the magiſtrates immediately ſuppreſſed it, by removing the ſick into peſt-houſes, without the town, as is well remembered there to this time. A very remarkable occurrence has greatly contributed towards preſerving all the circumſtances of this tranſaction in memory. They found ſome difficulty in procuring any one to attend upon the ſick after their removal: which obliged the town to engage a young woman, then under ſentence of death, in that ſervice, on a promiſe to uſe their intereſt for obtaining her pardon. The young woman eſcaped the diſeaſe, but neglecting to ſolicite the corporation for the accompliſhment of their engagement with her, three or four months after ſhe was barbarouſly hanged by the mayor upon a quarrel between them.

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[o] Cardin. Gaſtaldi, De avertendâ Peſte, c. 10.

[p] Journal de ce qui s'eſt paſſé à Marſeilles, &c. p. 9, 10, 11.

I would have it here obſerved, that as the advice I have been giving is founded upon this principle, that the beſt method for ſtopping infection, is to ſeparate the healthy from the diſeaſed; ſo in ſmall towns and villages, where it is practicable, if the ſound remove themſelves into barracks, or the like airy habitations, it may probably be even more uſeful, than to remove the ſick. This method has been found beneficial in France after all others have failed. But the ſucceſs of this proves the method of removing the ſick, where this other cannot be practiſed, to be the moſt proper of any.

When the ſick families are gone, all the goods of the houſes, in which they were, ſhould be buried deep under ground. This I prefer to burning them: becauſe, eſpecially in a cloſe place, ſome infectious particles may poſſibly be diſperſed by the ſmoke through the neighbourhood; according to what Mercurialis relates, that the Plague in Venice was augmented by burning a large quantity of infected goods in the city[q]. A learned phyſician of my acquaintance lately communicated to me the relation of a caſe, (given to him by an apothecary, who was at the place when the thing happened) very proper to be here mentioned. The ſtory is this. At Shipſton, a little town upon the river Stour in Worceſterſhire, a poor vagabond was ſeen walking in the ſtreets with the ſmall-pox upon him. The people frightened took care to have him carried to a little houſe, ſeated upon a hill, at ſome diſtance from the town, providing him with neceſſaries. In a few days the man died. They ordered him to be buried deep in the ground, and the houſe with his clothes to be burnt. The wind being pretty high, blew the ſmoke upon the houſes on one ſide of the town: in that part a few days after, eight perſons were ſeized with the ſmall-pox. So dangerous is heat in all kinds of peſtilential diſtempers, and ſo diffuſive of contagion. And moreover the houſes themſelves may likewiſe be demoliſhed or pulled down, if that can conveniently be done; that is, if they are remote enough from others: otherwiſe it may ſuffice to have them thoroughly cleanſed, and then plaſtered up. And after this, all poſſible care ought ſtill to be taken to remove whatever cauſes are found to breed and promote contagion. In order to this, the overſeers of the poor (who might be aſſiſted herein by other officers) ſhould viſit the dwellings of all the meaner ſort of the inhabitants; and where they find them ſtifled up too cloſe and naſty, ſhould leſſen their number by ſending ſome into better lodgings, and ſhould take care, by all manner of proviſion and encouragement, to make them more cleanly and ſweet.

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[q] De Peſtilent. cap. 21.

No good work carries its own reward with it ſo much as this kind of charity: and therefore, be the expence what it will, it muſt never be thought unreaſonable. For nothing approaches ſo near to the firſt original of the Plague, as air pent up, loaded with damps, and corrupted with the filthineſs, that proceeds from animal bodies.

Our common priſons afford us an inſtance of ſomething like this, where very few eſcape what they call the jail fever, which is always attended with a degree of malignity in proportion to the cloſeneſs and ſtench of the place: and it would certainly very well become the wiſdom of the government, as well with regard to the health of the town, as in compaſſion to the priſoners, to take care, that all houſes of confinement ſhould be kept as airy and clean, as is conſiſtent with the uſe, to which they are deſigned.

The black aſſize at Oxford, held in the caſtle there in the year 1577, will never be forgot [r]; at which the judges, gentry, and almoſt all that were preſent, to the number of three hundred, were killed by a poiſonous ſteam, thought by ſome to have broken forth from the earth; but by a noble and great philoſopher [s] more juſtly ſuppoſed to have been brought by the priſoners out of the jail into court; it being obſerved, that they alone were not injured by it.

At the ſame time that this care is taken of houſes, the proper officers ſhould be ſtrictly charged to ſee that the ſtreets be waſhed and kept clean from filth, carrion, and all manner of nuſances; which ſhould be carried away in the night time: nor ſhould the layſtalls be ſuffered to be too near the city. Beggars and idle perſons ſhould be taken up, and ſuch miſerable objects, as are neither fit for the common hoſpitals, nor work-houſes, ſhould be provided for in an hoſpital of incurables.

Orders indeed of this kind are neceſſary to be obſerved at all times, eſpecially in populous cities; and therefore I am ſorry to take notice that in theſe of London and Weſtminſter there is no good police eſtabliſhed in theſe reſpects: for want of which the citizens and gentry are every day annoyed more ways than one.

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[r] Camden. Annal. Regin. Elizab.

[s] Lord Verulam, Natural Hiſtory, Cent. 10. Num. 194

If theſe early precautions, we have mentioned, prove ſucceſsful, there will be no need of any methods for correcting the air, purifying houſes, or of rules for preſerving particular perſons from infection: to all which, if the Plague get head, ſo that the ſick are too many to be removed (as they will be when the diſeaſe has raged for a conſiderable time) regard muſt be had.

As to the firſt: fire has been almoſt univerſally recommended for this purpoſe, both by the antients and moderns; who have adviſed to make frequent and numerous fires in the towns infected. This precept, I think, is almoſt entirely founded upon a tradition, that Hippocrates put a ſtop to a Plague in Greece by this means. But it is to be obſerved, that there is no mention made of any thing like it in the works of Hippocrates. The beſt authority we have for it, is the teſtimony of Galen, though it is alſo mentioned by other authors. Galen, recommending Theriaca againſt the peſtilence, has thought fit, it ſeems, to compare it to fire; and, upon this conceit, relates, that Hippocrates cured a Plague, which came from Æthiopia into Greece, by purifying the air with fires; into which were thrown ſweet-ſcented herbs and flowers, together with ointments of the fineſt flavour. It is remarkable, that among the epiſtles aſcribed to Hippocrates, which, though not genuine, yet are older than Galen, there is a decree ſaid to be made by the Athenians in honour of this father of phyſicians, which, making mention of the ſervice he had done his country in a Plague, ſays only, that he ſent his ſcholars into ſeveral parts, with proper inſtructions to cure the diſeaſe. By which it ſhould ſeem, that this ſtory of the fires was hardly or not at all known at the time when theſe letters were compiled. And Soranus may yet more confirm us, that it was framed long after the death of Hippocrates: for Soranus only ſays in general, that Hippocrates foretold the coming of the peſtilence, and took care of the cities of Greece; without any mention of having uſed this particular expedient. Plutarch indeed ſpeaks of a practice like this as commonly approved among phyſicians, which he makes uſe of to illuſtrate a certain cuſtom of the Egyptians: of whom he ſays, that they purify the air by the fumes of reſin and myrrh, as phyſicians correct the foulneſs, and attenuate the thickneſs thereof in times of peſtilence, by burning ſweet-woods, juniper, cypreſs [t].

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[t] Plutarch. lib. de Iſid. & Oſir.

This I take to be the ſum of what can be learned from antiquity in relation to this point; from whence we may ſee, that writers have concluded a little too haſtily for the uſe of common fires in this caſe, upon the authority and example of Hippocrates, though we ſhould allow the fact as related by Galen: when it will not from thence appear that Hippocrates himſelf relied upon them; ſince he thought it neceſſary to take in the aſſiſtance of aromatick fumes. But as this fact is not grounded upon ſufficient authority, ſo it is needleſs to inſiſt long upon it. The paſſage I have brought from Plutarch will better explain what was the ſentiment of thoſe phyſicians who approved the practice. It ſeems they expected from thence to diſpel the thickneſs and foulneſs of the air. And no doubt but ſuch evil diſpoſitions of the air, as proceed from damps, exhalations, and the like, may be corrected even by common fires, and the prediſpoſition of it from theſe cauſes to receive infection ſometimes removed. But I think this method, if it be neceſſary, ſhould be put in practice before the coming of the peſtilence. For when the diſtemper is actually begun, and rages, ſince it is known to be ſpread and increaſed by the heat of the ſummer, and on the contrary checked by the cold in winter; undoubtedly, whatever increaſes that heat, will ſo far add force to the diſeaſe: as Mercurialis takes notice, that ſmiths, and all thoſe who worked at the fire were moſt ſeverely uſed in the Plague at Venice in his time [u]. Whether the ſervice fires may do by correcting any other ill qualities of the air, will counterbalance the inconvenience upon this account, experience only can determine: and the fatal ſucceſs of the trials made here in the laſt Plague, is more than ſufficient to diſcourage any farther attemps of this nature. For fires being ordered in all the ſtreets for three days together, there died in one night following no leſs than four thouſand (if we may believe Dr. Hodges:) whereas in any ſingle week before or after, never twice that number were carried off [x]. And we find that upon making the ſame experiment in the laſt Plague at Marſeilles, the contagion was every day ſpread more and more through the city with increaſed rage and violence [y].

What has been ſaid of fires, is likewiſe to be underſtood of firing of guns, which ſome have too raſhly adviſed. The proper correction of the air would be to make it freſh and cool: according accordingly the Arabians [z], who were beſt acquainted with the nature of peſtilences, adviſe people to keep themſelves as airy as poſſible, and to chuſe dwellings expoſed to the wind, ſituate high, and refreſhed with running waters.

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[u] De Peſte, c. 22. [x] Hodges, De Peſte, p. 24. [y] Journal de la Peſte de Marſeilles. p. 19, & Relation Hiſtorique de tout ce qui s'eſt paſſé à Marſeilles pendant la derniere Peſte, pag. 77.

As for houſes, the firſt care ought to be to keep them clean: for as naſtineſs is a great ſource of infection, ſo cleanlineſs is the greateſt preſervative; which ſhews us the true reaſon, why the poor are moſt obnoxious to contagious diſeaſes. It is remarked of the Perſians, that though their country is ſurrounded every year with the Plague, they ſeldom or never ſuffer any thing by it themſelves: and it is likewiſe known, that they are the moſt cleanly people of any in the world, and that many among them make it a great part of their religion to remove filthineſs and nuſances of every kind from all places about their cities and dwellings [a].

Beſides this, the Arabians adviſe the keeping houſes cool, as another method of purification, and therefore, to anſwer this end more fully, they directed to ſtrew them with cooling herbs, as roſes, violets, water-lilies, &c. and to be waſhed with water and vinegar: than all which, eſpecially the laſt, nothing more proper can be propoſed. I think it not improper likewiſe to fume houſes with vinegar, either alone or together with nitre, by throwing it upon a hot iron or tile; though this be directly contrary to what modern authors moſtly adviſe, which is to make fumes with hot things, as benzoin, frankincenſe, ſtorax, &c. from which I ſee no reaſon to expect any virtue to deſtroy the matter of infection, or to keep particular places from a diſpoſition to receive it; which are the only things here to be aimed at. The ſmoke of ſulphur, perhaps, as it abounds with an acid ſpirit, which is found by experience to be very penetrating, and to have a great power to repreſs fermentations, may promiſe ſome ſervice this way.

As hot fumes appear to be generally uſeleſs, ſo the ſteams of poiſonous minerals ought to be reckoned dangerous: and therefore I cannot but diſſuade the uſe of all fumigations with mercury or arſenick. Much leſs would I adviſe, as ſome have done, the wearing arſenick upon the pit of the ſtomach as an amulet: ſince this practice has been often attended with very ill conſequences, and is not grounded upon any good authority, ty, but probably derived from an error in miſtaking the Arabian word darſini, which ſignifies cinnamon, for the Latin de arſenico, as I have formerly ſhewn [b].

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[z] Rhazes, De re Medica, lib. iv. c. 24, & Avicenn. Can. Med. lib. iv. c. 1.

[a] Gaudereau Relation des Eſpeces de la Peſte que reconnoiſſent les Orientaux.

The next thing after the purifying of houſes, is to conſider by what means particular perſons may beſt defend themſelves againſt contagion: for the certain doing of which, it would be neceſſary to put the humours of the body into ſuch a ſtate, as not to be alterable by the matter of infection. But ſince this is no more to be hoped for, than a ſpecifick preſervative from the ſmall-pox; the moſt that can be done, will be to keep the body in ſuch order, that it may ſuffer as little as poſſible. The firſt ſtep towards which, is to maintain a good ſtate of health, in which we are always leaſt liable to ſuffer by any external injuries; and not to weaken the body by evacuations. The next is, to guard againſt all dejection of ſpirits, and immoderate paſſions: for theſe we daily obſerve do expoſe perſons to the more common contagion of the ſmall-pox. Theſe ends will be beſt anſwered by living with temperance upon a good generous diet, and by avoiding faſtings, watchings, extreme wearineſs, &c. Another defence is, to uſe whatever means are proper to keep the blood from inflaming. This, if it does not ſecure from contracting infection, will at leaſt make the effects of it leſs violent. The moſt proper means for this, according to the advice of the Arabian phyſicians, is the repeated uſe of acid fruits, as pome-granates, ſevil oranges, lemons, tart apples, &c. But above all, of wine vinegar in ſmall quantities, rendered grateful to the ſtomach by the infuſion of ſome ſuch ingredients as gentian root, galangal, zedoary, juniper berries, &c. Which medicines by correcting the vinegar, and taking off ſome ill effects it might otherwiſe have upon the ſtomach, will be of good uſe: but theſe, and all other hot aromatick drugs, though much recommended by authors, if uſed alone, are moſt likely to do hurt by over-heating the blood.

I cannot but recommend likewiſe the uſe of iſſues. The propereſt place for them I take to be the inſide of the thigh a little above the knee. Beſides, the ſmoking tobacco, much applauded by ſome, ſince it may be put in practice without any great inconvenience, need not, I think, be neglected.

But ſince none of theſe methods promiſe any certain protection; as leaving the place infected is the ſureſt preſervative, ſo the next to it is to avoid, as much as may be, the near approach to the ſick, or to ſuch as have but lately recovered.

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[b] Mech. Account of Poiſons, Eſſay III.

For the greater ſecurity herein, it will be adviſeable to avoid all crouds of people. Nay, it ſhould be the care of the magiſtrate to prohibit all unneceſſary aſſemblies; and likewiſe to oblige all, who get over the diſeaſe, to confine themſelves for ſome time, before they appear abroad.

The advice to keep at a diſtance from the ſick, is alſo to be underſtood of the dead bodies; which ſhould be buried at as great a diſtance from dwelling-houſes, as may be; put deep in the earth; and covered with the exacteſt care; but not with quick-lime thrown in with them, as has been the manner abroad: for I cannot but think that this, by fermenting with the putrefying humours of the carcaſes, may give riſe to noxious exhalations from the ground. They ſhould likewiſe be carried out in the night, while they are yet freſh and free from putrefaction: becauſe a carcaſe not yet beginning to corrupt, if kept from the heat of the day, hardly emits any kind of ſteam or vapour.

As for thoſe, who muſt of neceſſity attend the ſick; ſome farther directions ſhould be added for their uſe. Theſe may be comprehended in two ſhort precepts. One is, not to ſwallow their ſpittle while they are about the ſick, but rather to ſpit it out: the other, not ſo much as to draw in their breath, when they are very near them. The reaſon for both theſe appears from what has been ſaid above concerning the manner, in which a ſound perſon receives the infection. But in caſe it be too difficult conſtantly to comply with theſe cautions, waſhing the mouth frequently with vinegar, and holding to the noſtrils a ſponge wet with the ſame, may in ſome meaſure ſupply their place.

This is the ſum of what I think moſt likely to ſtop the progreſs of the diſeaſe in any place, where it ſhall have got admittance. If ſome few of theſe rules refer more particularly to the city of London, with ſmall alteration they may be applied to any other place. It now remains therefore only to lay down ſome directions to hinder the diſtemper's ſpreading from town to town. The beſt method for which, where it can be done, (for this is not practicable in very great cities) is to caſt up a line about the town infected, at a convenient diſtance; and by placing a guard, to hinder people's paſſing from it without due regulation, to other towns: but not abſolutely to forbid any to withdraw themſelves, as was done in France, according to the uſual practice abroad; which is an unneceſſary ſeverity, not to call it a cruelty. I think it will be enough, if all, who deſire to paſs the line, be permitted to do it, upon condition they firſt perform quarantaine, for about twenty days in tents, or other more convenient habitations. But the greateſt care muſt be taken, that none paſs without conforming themſelves to this order: both by keeping diligent watch, and by puniſhing, with the utmoſt ſeverity, any that ſhall either have done ſo, or attempt it. And the better to diſcover ſuch, it will be requiſite to oblige all, who travel in any part of the country, under the ſame penalties, to carry with them certificates either of their coming from places not infected, or of their paſſing the line by permiſſion.

This I take to be a more effectual method to keep the infection from ſpreading, than the abſolute refuſing a paſſage to people upon any terms. For when men are in ſuch imminent danger of their lives where they are, many, no doubt, if not otherwiſe allowed to eſcape, will uſe endeavours to do it ſecretly, let the hazard be ever ſo great. And it can hardly be, but ſome will ſucceed in their attempts; as we ſee it has often happened in France, notwithſtanding all their care. But one that gets off thus clandeſtinely, will be more likely to carry the diſtemper with him, than twenty, nay, a hundred, that go away under the preceding reſtrictions: eſpecially becauſe the infection of the place, he flies from, will by this management be rendered much more intenſe. For confining people, and ſhutting them up together in great numbers, will make the diſtemper rage with augmented force, even to the increaſing it beyond what can be eaſily imagined: as appears from the account which the learned Gaſſendus[c] has given us of a memorable Plague, which happened at Digne in Provence, where he lived, in the year 1629. This was ſo terrible, that in one ſummer, out of ten thouſand inhabitants, it left but fifteen hundred, and of them all but five or ſix had gone through the diſeaſe. And he aſſigns this, as the principal cauſe of the great deſtruction, that the citizens were too cloſely confined, and not ſuffered ſo much as to go to their country houſes. Whereas in another peſtilence, which broke out in the ſame place a year and an half after, more liberty being allowed, there did not die above one hundred perſons.

For theſe reaſons, I think, to allow people with proper cautions to remove from an infected place, is the beſt means to ſuppreſs the contagion, as well as the moſt humane treatment of the preſent ſufferers: and, under theſe limitations, the method of inveſting towns infected, which is certainly the moſt proper, that can be adviſed, to keep the diſeaſe from ſpreading, will be no inconvenience to the places ſurrounded. On the contrary, it will rather be uſeful to them; ſince the guard may eſtabliſh ſuch regulations for the ſafety of thoſe, who ſhall bring proviſions, as ſhall remove the fears, which might otherwiſe diſcourage them.

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[c] Notitia Eccleſiæ Dinienſis.

The ſecuring againſt all apprehenſions of this kind, is of ſo great importance, that in cities too large to be inveſted, as, for example, this city of London, the magiſtrates muſt uſe all poſſible diligence to ſupply this defect, not only by ſetting up barriers without their city, but by making it in the moſt particular manner their care to appoint ſuch orders to be obſerved at them, as they ſhall judge will be moſt ſatisfactory to the country about.

Though liberty ought to be given to the people, yet no ſort of goods muſt by any means be ſuffered to be carried over the line, which are made of materials retentive of infection. For in the preſent caſe, when infection has ſeized any part of a country, much greater care ought to be taken, that no ſeeds of the contagion be conveyed about, than when the diſtemper is at a great diſtance: becauſe a bale of goods, which ſhall have imbibed the contagious aura when packed up in Turky, or any remote parts, when unpacked here, may chance to meet with ſo healthful a temperament of our air, that it ſhall not do much hurt. But when the air of any one of our towns ſhall be ſo corrupted, as to maintain and ſpread the peſtilence in it, there will be little reaſon to believe, that the air of the reſt of the country is in a much better ſtate.

For the ſame reaſon quarantaines ſhould more ſtrictly be enjoined, when the Plague is in a bordering kingdom, than when it is more remote.

The advice here given with reſpect to goods, is not only abundantly confirmed from the proofs I have given above, that goods have a power of ſpreading contagion to diſtant places; but might be farther illuſtrated by many inſtances of ill effects from the neglect of this caution in times of the Plague. I ſhall mention two, which happened among us during the laſt Plague. I have had occaſion already to obſerve, that the Plague was in Poole. It was carried to that place by ſome goods contained in a pedlar's pack. The Plague was likewiſe at Eham in the Peak of Derbyſhire, being brought thither by means of a box ſent from London to a taylor in that village, containing ſome materials relating to his trade. There being ſeveral incidents in this latter inſtance, that will not only ſerve to eſtabliſh in particular the precepts I have been giving, in relation to goods, but likewiſe all the reſt of the directions, that have been ſet down, for ſtopping the progreſs of the Plague from one town to another; I ſhall finiſh this chapter with a particular relation of what paſſed in that place. A ſervant, who firſt opened the aforeſaid box, complaining that the goods were damp, was ordered to dry them at the fire; but in doing it was ſeized with the Plague, and died: the ſame misfortune extended itſelf to all the reſt of the family, except the taylor's wife, who alone ſurvived. From hence the diſtemper ſpread about and deſtroyed in that village, and the reſt of the pariſh, though a ſmall one, between two and three hundred perſons. But notwithſtanding this ſo great violence of the diſeaſe, it was reſtrained from reaching beyond that pariſh by the care of the rector; from whoſe ſon, and another worthy gentleman, I have the relation. This clergyman adviſed, that the ſick ſhould be removed into hutts or barracks built upon the common; and procuring by the intereſt of the then earl of Devonſhire, that the people ſhould be well furniſhed with proviſions, he took effectual care, that no one ſhould go out of the pariſh: and by this means he protected his neighbours from infection with compleat ſucceſs.

I have now gone through the chief branches of preſervation againſt the Plague, and ſhall conclude with ſome general directions concerning the cure.

CHAP. III.

Of the cure of the Plague.

IT appears, from what has been ſaid in the beginning of this diſcourſe, that the Plague and the ſmall-pox are diſeaſes, which bear a great ſimilitude to each other: both being contagious fevers from Africa, and both attended with certain eruptions. And as the eruptions or puſtules in the ſmall-pox are of two kinds, which has cauſed the diſtemper to be divided into two ſpecies, the diſtinct and confluent: ſo we have ſhewn two ſorts of eruptions or tumors likewiſe to attend the Plague. In the firſt and mildeſt kind of the ſmall-pox the puſtules riſe high above the ſurface of the ſkin, and contain a digeſted pus: but in the other, the puſtules lie flat, and are filled with an indigeſted ſanies. The two kinds of critical tumors in the Plague are yet more different. In the moſt favourable caſe the morbifick matter is thrown upon ſome of the ſofteſt glands near the ſurface of the body, as upon the inguinal axillary, parotid, or maxillary glands: the firſt appearance of which is a ſmall induration, great heat, redneſs, and ſharp pain near thoſe glands. Theſe tumors, if the patient recover, like the puſtules of the diſtinct ſmall-pox, come to a juſt ſuppuration, and thereby diſcharge the diſeaſe. In worſe caſes of the diſtemper, either inſtead of theſe tumors, or together with them, carbuncles are raiſed. The firſt appearance of them is a very ſmall indurated tumor, not ſituate near any of the fore-mentioned glands, with a duſky redneſs, violent heat, vaſt pain, and a blackiſh ſpot in the middle of the tumor. This ſpot is the beginning of a gangrene, which ſpreads itſelf more and more as the tumor increaſes.

But, beſides the agreement in theſe critical diſcharges, the two diſtempers have yet a more manifeſt likeneſs in thoſe livid and black ſpots, which are frequent in the Plague, and the ſigns of ſpeedy death: for the ſame are ſometimes found to attend the ſmall-pox with as fatal a conſequence; nay, I have ſeen caſes, when almoſt every puſtule has taken this appearance. Moreover, in both diſeaſes, when eminently malignant, blood is ſometimes voided by the mouth, by urine, or the like [f]. And we may farther add, that in both death is uſually cauſed by mortifications in the viſcera. This has conſtantly been found in the Plague by the phyſicians in France: and I am convinced, from accounts I have by me, of the diſſection of a great many, who had died of the ſmall-pox, that it is the ſame in that diſtemper.

This analogy between the two diſeaſes, not only ſhews us, that we cannot expect to cure the Plague any more than the ſmall-pox, by antidotes and ſpecifick medicines; but will likewiſe direct us in the cure of the diſtemper, with which we are leſs acquainted, by the methods found uſeful in the other diſeaſe, which is more familiar to us.

In ſhort, as in the ſmall-pox, the chief part of the management conſiſts in clearing the primæ viæ in the beginning; in regulating the fever; and in promoting the natural diſcharges: ſo in the Plague the ſame indications will have place. The great difference lies in this, that in the Plague the fever is often much more acute than in the other diſtemper: the ſtomach and bowels are ſometimes inflamed; and the eruptions require external applications, which to the puſtules of the ſmall-pox are not neceſſary.

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[f] Vid. Obſerv. & Reflex. ſur la Peſte de Marſeilles, p. 333.

When the fever is very acute, a cool regimen, commonly ſo beneficial in the ſmall-pox, is here ſtill more neceſſary. But whenever the pulſe is languid, and the heat not exceſſive, moderate cordials muſt be uſed.

The diſpoſition of the ſtomach and bowels to be inflamed, makes vomiting not ſo generally ſafe in the Plague as in the ſmall-pox. The moſt gentle emeticks ought to be uſed, none better than ipecacuanha; and great caution muſt be had, that the ſtomach or bowels are not inflamed, when they are adminiſtered: for if they are, nothing but certain death can be expected from them: otherwiſe at the beginning they will be always uſeful. Therefore upon the firſt illneſs of the patient it muſt carefully be conſidered, whether there appear any ſymptoms of an inflammation having ſeized theſe parts: if there are any marks of this, all vomits muſt be omitted; if not, the ſtomach ought to be gently moved.

The eruptions, whether glandular tumors, or carbuncles, muſt not be left to the courſe of nature, as is done in the ſmall-pox; but all diligence muſt be uſed, by external applications, to bring them to ſuppurate. Both theſe tumors are to be treated in moſt reſpects alike. As ſoon as either of them appears, fix a cupping-glaſs to it without ſcarifying; and when that is removed, apply a ſuppurative cataplaſm, or plaſter of warm gums.

If the tumors do not come to ſuppuration, which the carbuncle ſeldom or never does; but if a thin ichor or matter exudes through the pores; or if the tumor feel ſoft to the touch; or laſtly, if it has a black cruſt upon it, then it muſt be opened by inciſion, either according to the length of the tumor, or by a crucial ſection. And if there is any part mortified, as is uſually in the carbuncle, it muſt be ſcarified. This being done, it will be neceſſary to ſtop the bleeding, and dry up the moiſture with an actual cautery, dreſſing the wound afterwards with doſſils, and pledgits ſpread with the common digeſtive made with terebinth. cum vitel. ov. and dipped in a mixture of two parts of warmed oil of turpentine, and one part of ſp. ſal. ammon. or in balſ. te. rebinth. and over all muſt be put a cataplaſm of theriac. lond.

The next day the wound ought to be well bathed with a fomentation made of warm aromatick plants with ſpirit of wine in it; in order, if poſſible, to make the wound digeſt, by which the ſloughs will ſeparate. After this the ulcer may be treated as one from an ordinary abſceſs.

Farther, in the glandular tumors, when they ſuppurate, we ought not to wait, till the matter has made its way to the outer ſkin, but to open it as ſoon as it is riſen to any bigneſs: becauſe theſe tumors begin deep in the gland, and often mortify, before the ſuppuration has reached the ſkin, as the phyſicians in France have found upon diſſecting many bodies.

This is the method in which the Plague muſt be treated in following the natural courſe of the diſtemper. But the patient in moſt caſes runs ſo great hazard in this way, notwithſtanding the utmoſt care, that it would be of the greateſt ſervice to mankind under this calamity, if ſome artificial diſcharge for the corrupted humours could be found out, not liable to ſo great hazard, as the natural way. To this purpoſe large bleeding and profuſe ſweating are recommended to us upon ſome experience.

Dr. Sydenham tried both theſe evacuations with good ſucceſs, and has made two very judicious remarks upon them. The firſt is, that they ought not to be attempted unleſs in the beginning of the ſickneſs, before the natural courſe of the diſtemper has long taken place: becauſe otherwiſe we can only expect to put all into confuſion without any advantage. His other obſervation is, that we cannot expect any proſperous event from either of theſe evacuations, unleſs they are very copious: there being no proſpect of ſurmounting ſo violent a malignity without bolder methods than muſt be taken in ordinary caſes.

As for bleeding, by ſome accounts from France, I have been informed, that ſome of the phyſicians there have carried this practice ſo far, as upon the firſt day of the diſtemper to begin with bleeding about twelve ounces, and then to take away four or five ounces every two hours after. They pretend to extraordinary ſucceſs from this method, with the aſſiſtance only of cooling ptiſanes, and ſuch like drinks, which they have plentifully at the ſame time. Such profuſe bleeding as this may perhaps not ſuit with our conſtitutions ſo well as with theirs; for in common caſes they uſe this practice much more freely than we: yet we muſt draw blood with a more liberal hand than in any other caſe, if we expect ſucceſs from it. I ſhall excuſe myſelf from defining exactly how large a quantity of blood is requiſite to be drawn, for want of particular experience: but I think fit to give this admonition, that, in ſo deſperate a caſe as this, it is more prudent to run ſome hazard of exceeding, than to let the patient periſh for want of due evacuation.

As for ſweating, which is the other method propoſed, it ought, no doubt, to be continued without intermiſſion full twenty four hours, as Dr. Sydenham adviſes. He is ſo particular in his directions about it, that I need ſay little. I ſhall only add, that theriaca, and the like ſolid medicines, being offenſive to the ſtomach, are not the moſt proper ſudorificks. I ſhould rather commend an infuſion in boiling water of Virginia ſnake-root, or, in want of this, of ſome other warm aromatick, with the addition of about a fourth part of aqua theriacalis, and a proper quantity of ſyrup of lemons to ſweeten it. From which, in illneſſes of the ſame kind with the jail fever, which approaches the neareſt to the peſtilence, I have ſeen very good effects.

Whether either of theſe methods, of bleeding, or of ſweating, will anſwer the purpoſe intended by them, muſt be left to a larger experience to determine ; and the trial ought by no means to be neglected, eſpecially in thoſe caſes, which promiſe but little ſucceſs from the natural courſe of the diſeaſe.

A
DISCOURSE
ON THE
SMALL-POX
AND
MEASLES.

PREFACE.

A Conſiderable part of this diſcourſe was written by me many years ſince; and the whole had been finiſhed and given to the publick long ago, would the buſineſs of my profeſſion, in which I have been conſtantly engaged, have allowed me time to do it. However, I flatter myſelf, that this intermiſſion of the work will in the main turn to the advantage of the reader: becauſe whatever inconveniencies may attend age, they are for the moſt part amply compenſated by daily acquiſitions of knowledge and experience. Wherefore, without farther apology, I ſhall now briefly lay down the motives, which firſt induced me to write on this ſubject.

In the year 1717 the learned Dr. Friend publiſhed the firſt and third books of Hippocrates's Epidemicks, illuſtrated with nine commentaries concerning fevers. Of theſe the ſeventh treats of purging in the putrid fever, which follows upon the confluent Small-Pox; and in ſupport of his opinion, he has annexed to it the letters of four phyſicians to himſelf on that ſubject; one of which is mine. For after having been ſeveral years one of the phyſicians to St. Thomas's hoſpital, in the year 1708, I obſerved, that ſome of my patients recovered from a very malignant ſort of Small-Pox, even beyond expectation, by a loſeneſs ſeizing them on the ninth or tenth day of the diſeaſe, and ſometimes earlier. Hence I took the hint, to try what good might be done by opening the body with a gentle purge on the decline of the diſtemper, eſpecially where the patient had conſtantly been coſtive from the beginning; which is far from being an uncommon caſe. The ſucceſs was in a great meaſure anſwerable to my wiſhes: for by this method I recovered many, who were in the moſt imminent danger.

At that time, and indeed during the remainder of his life, I was ſtrictly joined in friendſhip with Dr. Friend; and as we frequently converſed on the buſineſs of our profeſſion, I explained this point of practice to him, and met with his approbation. Soon after this, he was called to a conſultation with two other eminent phyſicians, on the caſe of a young nobleman, who lay dangerouſly ill of the Small-Pox: whereupon, he propoſed my method. But they obſtinately oppoſed it until the fourteenth day from the eruption, when the caſe appearing quite deſperate by convulſions with a lethargy coming on apace, they conſented to give him a gentle laxative draught; which had a very good effect. Hereupon Dr. Friend gave his opinion to repeat it; but that was over-ruled and the patient died the ſeventh day after. The doctor himſelf has given an ample account of this caſe [a].

This affair ſoon made ſo great a noiſe, that even the gentlemen of the faculty were divided upon it; ſome commending, others finding fault with Dr. Friend's advice: which ſo eſſentially affected his reputation, that he thought himſelf under a neceſſity of vindicating it: and therefore he entreated me to ſend him the purport of our former converſation in writing. Such was our friendſhip, that I ſoon complied with his requeſt; and he ſhewed my letter to Dr. Radcliffe, (who at that time was very deſervedly at the head of his profeſſion, upon account of his great medical penetration and experience, and had honoured me with a conſiderable ſhare of intimacy) and told him withal, that he intended to publiſh his defence. Whereupon Dr. Radcliffe obtained leave of me for Dr. Friend to annex my letter to his book. But after two or three ſheets had been printed off, he was prevailed on by ſome friends to drop his undertaking; and thus both his work and my letter lay by for ſome years, that is, until he publiſhed his commentaries on fevers While he was employed in this work, he had freſh thoughts of printing the aforeſaid letter with it; for which purpoſe I reviſed and enlarged the letter, tranſlated it from the original Engliſh into Latin, and, in ſhort, newmodelled it into the form in which it appears in that book.

It very rarely happens, that a new method of cure in any diſeaſe gives univerſal ſatisfaction: however, not only Dr. Friend and myſelf invariably perſiſted in this from the firſt time I mentioned it to him; but ſeveral phyſicians likewiſe, both in town and country, to whom we imparted it, found its ſalutary effects. But there never are wanting ſome men of ſo invidious a turn of mind, that their principal pleaſure conſiſts in blackening the reputation, and decrying the productions of others; as if what they ſtrip their neighbours of, was to be added to their own characters. Thus Dr. Friend's book had no ſooner appeared in publick, but ſome of this ſtamp flew to arms, as if to ſave the commonwealth. In front of this band ſtood forth Dr. John Woodward, phyſick-profeſſor at Greſham college, a man equally ill-bred, vain, and ill-natured, who, after being for ſome time apprentice to a linen-draper, took it into his head to make a collection of ſhells and foſſils, in order to paſs upon the world for a philoſopher; thence having got admiſſion into a phyſician's family, at length, by dint of intereſt, obtained a doctor's degree. This man publiſhed a book, intitled, The ſtate of phyſick and diſeaſes [b], wherein he took great liberties with Dr. Friend, and thoſe in the ſame ſentiment with him, but pointed his arrows moſt particularly at me; and theſe were neither arguments nor experiments, of which he had none, but bare-faced calumny and raillery, which he poured forth in abundance. It is much againſt my will, that I thus revive the remembrance of that libel, which already is well nigh ſunk into oblivion; and for which the author has been juſtly expoſed by Dr. Friend: nor ſhould I have waſted paper on this inſignificant ſtory, had not the arrogance and vanity of the man extorted it from me. And in fine, if I have dwelt longer on this whole affair than might be expected, my motives were, firſt, to explain who was the author of this method of practice, and then, how little foundation Dr. Woodward had for his perſonal reflections and brawling.

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[a] Freindi Opera, p. 293.

Now, as to what concerns this diſcourſe, I muſt inform the publick, that I have preferred perſpicuity to flowers of language, by delivering every precept in as few words as to me ſeemed conſiſtent with a clear conveyance of my notions; and I have added ſome particular rules and cautions relating to catharticks, for the ſake of young phyſicians chiefly; who are often diſpoſed too raſhly to attempt, and too eagerly to embrace every novelty in practice, eſpecially, when handed down to them from perſons, of whom they have a high opinion. For nothing can be ſo univerſally uſeful, as not to be liable to ſome exception; and it is ſometimes as great a mark of ſound judgment, not to do miſchief, as to do good [c]. Whererefore, not only in this caſe, but in all others within the compaſs of our art, the phyſician ought conſtantly to remember that of the poet [d],

Nothing does good, but what may alſo hurt.

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[b] London, 1718. 8vo. [c] Hippocrates in his firſt book of epidemicks. [d] Ovid. Triſt. lib. ii. ver. 266.

When I had finiſhed this ſmall work, I thought it might be no leſs agreeable than uſeful to the gentlemen of the faculty, if to it I annexed Rhazes's treatiſe of the ſmall-pox and meaſles, faithfully tranſlated from the original Arabic into Latin: as it contains an ample detail of many things relating to the nature and cure of theſe diſeaſes, which, making proper allowances for time and place, coincide pretty much with the doctrines I have laid down. And indeed, it has given me no ſmall pleaſure, to ſee my ſentiments confirmed by the greateſt phyſician of the age he lived in. But I have often wondered how it came to paſs, that this book had never before been publiſhed either in Arabic, or in Latin from the Arabic. Robert Stephens was the firſt who publiſhed it in Greek, at the end of his edition of Alexander Trallian's work in the year 1548 [e]. The Greek copy has been tranſlated into Latin by three ſeveral perſons; the firſt of whom was Georgius Valla of Placentia, whoſe verſion was publiſhed at Venice, A. D. 1498, and went through ſeveral editions. This was followed by a ſecond, done by Johannes Guinterius of Andernac, printed at Straſbourg in 1549: and Nicolaus Macchellus, a phyſician of Modena, put forth a third, printed at Venice in 1555, and again in 1586 [f]. Now the Greek copy was not tranſlated directly from the Arabic, but from a Syriac verſion, which latter ſeems to have been done for the uſe of the common people; and upon comparing the Greek with this Engliſh tranſlation from the Arabic, which I now publiſh, it will appear very inaccurate, by the entire omiſſion of ſome things, and faulty rendering of others; whether through the inſufficiency, or negligence of the Syriac or Greek Tranſlator, I ſhall not determine. But the manner how I acquired my copy is this.

After having cauſed a diligent ſearch to be made in our publick libraries for an Arabic copy of this treatiſe to no purpoſe, I wrote to my good friend the celebrated Dr. Boerhaave, profeſſor of phyſick in the univerſity of Leyden, intreating him to inform me, if ſuch an one could be found in the publick library there, which I knew to be very rich in Arabic manuſcripts. A copy was accordingly found, which he got tranſcribed by the Arabic profeſſor, and kindly ſent it over to me; but it proved to be full of faults. This, however, I gave at two ſeparate times to two gentlemen of character, to put it into Latin. One was Solomon Negri, a native of Damaſcus, extremely well verſed in all the oriental tongues; the other John Gagnier, Arabic reader at Oxford: and they both performed the taſk with great diligence. But upon comparing the two verſions, I obſerved that they differed in ſeveral places, not in the diction only, but even in the ſenſe: wherefore, as I have no knowledge of the Arabic tongue, I could not determine which of the two to prefer. This incertainty made me apply to my worthy friend, the rev. Dr. Thomas Hunt, for ſeveral years paſt Arabic profeſſor in the univerſity of Oxford, and lately made Hebrew profeſſor likewiſe, who, among his many eminent qualities, is univerſally eſteemed a great maſter of the eaſtern languages. This gentleman, at my requeſt, generouſly undertook the province of ſtrictly collating the two Latin verſions abovementioned with the Arabic copy, in my preſence; and out of them he compiled this, which I now give to the publick; and doubtleſs he would have made it much better, had the Arabic copy been more correct.

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[e] The Greek title is Ῥαζῆ λόγος ϖερὶ λοιμικῆς.

[f] Vid. Fabricii Bibl. Græc. vol. xii. p. 692.

London, Sept.
29, 1747.

A
DISCOURSE
ON THE
SMALL-POX
AND
MEASLES.

CHAP. I.

Of the origin of the Small-Pox.

BEFORE I enter on the medical part of my ſubject, I ſhall briefly enquire into the origin of the Small-Pox, and the manner of its propagation from thoſe countries where it firſt appeared, almoſt over the whole face of the earth, as far as I can trace it in hiſtory: for theſe points once ſettled will throw a conſiderable light on the nature of the diſtemper, and the methods of cure, which I ſhall propoſe in the ſequel of the diſcourſe.

That this is a modern diſeaſe, whereby I mean, that it was not known to the ancient Greek and Roman phyſicians, is to me a matter beyond all doubt. For I think they are widely miſtaken, who endeavour to prove, that the anthrax, epinyctis, and and ſuch like eruptions on the ſkin, were our Small-pox: becauſe it is more than probable, that the ancient phyſicians, who were extremely diligent in the deſcription and diſtinctive characteriſticks of all diſeaſes, would not have been content with barely mentioning this, which is ſo contagious, and makes ſuch dreadful havock among mankind; but would have minutely deſcribed it, had they been acquainted with it.

Wherefore we muſt have recourſe to the writings of the Arabian phyſicians, for the firſt notices of this diſeaſe. The chief of theſe was Rhazes, who lived about the year of Chriſt 900. We have a large volume of this great man, publiſhed under the title of his Continent, a treaſure of phyſick, which ſeems to have been compiled from his common place book. In this he informs us, that a phyſician, whoſe name was Aaron (who wrote thirty books of phyſick) had treated of the diagnoſticks, the various kinds, and the method of cure of the Small-pox [a]. Now this Aaron was born at Alexandria, and in the reign of Mohammed practiſed about the year 622 [b]. Whence the learned Dr. Friend conjectured, that poſſibly the Small-pox took its riſe in Egypt [c]. But the origin of the diſeaſe is carried farther back than the time of this Aaron, by Dr. John James Reiſke, who ſays that he read the following words in an old Arabic manuſcript of the publick library at Leyden: This year in fine, the Small-pox and Meaſles made their firſt appearance in Arabia [d]. By this year he means that of the birth of Mohammed, which was the year of Chriſt 572.

Now upon mature conſideration of the whole affair, I am inclined to think that there are certain diſeaſes, which are originally engendered and propagated in certain countries, as in their native ſoil. Theſe by Hippocrates are called diſeaſes of the country [e]; and ſome of them, ſprung up in various parts of Europe and Aſia, from peculiar defects in the air, ſoil and waters, he has moſt accurately deſcribed [f]: but the more modern Greeks called them endemick diſeaſes [g]. Theſe, in my opinion, always exiſted in their reſpective native places, as proceeding from the ſame natural cauſes perpetually exerting themſelves.

It is found by experience, that ſome of theſe are contagious, and that the contagion is frequently propagated to very remote countries by means ſuitable to the nature of this or that diſeaſe. For ſome not only communicate the infection by immediate contact of the ſound with the morbid body, but have ſuch force, that they ſpread their pernicious ſeeds by emitting very ſubtile particles; which lighting on ſoft ſpongy ſubſtances, ſuch as cotton, wool, raw-ſilk, and cloathing, penetrate into them, and there remain pent up for a conſiderable time: in the ſame manner as I have elſewhere accounted for the wide progreſs of the plague from Africa its original country [h]. Others, on the contrary, are infectious by contact alone. Wherefore the firſt ſort may be ſpread by commerce, but the latter by cohabitation only.

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[a] Contin. 419. 2.

[b] Vid. Abulpharajii hiſt. Dynaſt. p. 99.

[c] Oper p. 330.

[d] Hoc demum anno comparuerunt primum in terris Arabum variolæ & morbilli. Diſp. inaug. Lug. Bat. 1746.

[e] Νȣσήματα ἐπιχώρια.

[f] Lib. de aëre, aquis, & locis.

[g] Ἐνδημίȣς. Vid. Galen. Com. i. in Epidem. Hip.

Of this kind is the venereal diſeaſe; which, according to hiſtorians of the moſt undoubted credit, is a native of ſome of the American iſlands, eſpecially Hiſpaniola, and was brought over into Spain near the end of the fifteenth century: thence, in the year 1495, it was carried to Naples, during the war between Ferdinand of Aragon and the French, by ſome Spaniſh troops, who had contracted it in the aforeſaid iſland. For theſe and the French ſoldiers having at different times had communication with the ſame women, according as the ſame towns alternately fell into the hands of the two contending parties; this filthy diſeaſe firſt ſpread itſelf over the two armies, thence made its way into Italy, and has ſince infected moſt parts of the habitable world [i].

And I very well remember, that a certain Engliſh merchant, who had reſided many years in Muſcovy, aſſured me, that the venereal diſeaſe was hardly known in that country before the reign of the late Czar Peter the Great: becauſe till that time the traffick carried on by the Moſcovites did not require much communication or dealing with foreigners. But after that emperor had taken the reſolution of viſiting other parts of Europe, and had ſent many of his ſubjects abroad to learn trades and manufactures; theſe carried back with them the dire effects of their unlawful luſt into their native country; which raged there with the greater ſeverity, as inflammations and ulcers are the more difficult to be cured in cold climates.

But to return to the Small-pox. I really take this diſeaſe to be a plague of its own kind, which was originally bred in Africa, and more eſpecially in Ethiopia, as the heat is exceſſive there; and thence, like the true plague, was brought into Arabia and Egypt after the manner abovementioned.

Now if any one ſhould wonder why this contagion was ſo long confined to its native ſoil, without ſpreading into diſtant countries; I pray him to conſider, that foreign commerce was much more ſparingly carried on in ancient times, than

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[h] Diſcourſe on the Plague, part i. chap. 1. page 242.

[i] Vid. Aſtruc de morbis veneris, lib. i. cap. 10, 11.

in

in our days, eſpecially between mediterranean nations: and likewiſe, that the ancients ſeldom or never undertook long voyages by ſea, as we do. And Ludolfus obſerves, that the Ethiopians in particular were ignorant of mercantile affairs [k]. Therefore, when in proceſs of time the mutual intercourſe of different nations became more frequent by wars, trade, and other cauſes; this contagious diſeaſe was ſpread far and wide. But towards the end of the eleventh century, and in the beginning of the twelfth, it gained vaſt ground, by means of the wars waged by a confederacy of the Chriſtian powers againſt the Saracens, for the recovery of the Holy land; this being the only viſible recompence of their religious expeditions, which they brought back to their reſpective countries. From that time forward, whereſoever this moſt infectious diſtemper once got a footing, there it has obſtinately held uninterrupted poſſeſſion. For the purulent matter, which runs out of the puſtules, being caught in the bed-cloaths and wearing apparel of the ſick, and there drying, and remaining inviſible, becomes a nurſery of the diſeaſe, which ſoon breaks forth on thoſe, who happen to come in contact with it; eſpecially if the ſeaſon of the year, and ſtate of the air be favourable to its action.

In this place, it may not be improper, in confirmation of the foregoing doctrine, to relate the following fact, which was atteſted to me by a gentleman of great experience, who had been for many years governor of Fort St. George in the Eaſt-Indies. While he was in that poſt, a Dutch ſhip put into the Cape of Good Hope, ſome of the crew of which had had the Small-pox in the voyage thither. The natives of that country, who are called Hottentots, are ſo wild and ſtupid, that they might ſeem to be of a middle ſpecies betwen men and brutes; and it is their cuſtom to do all ſervile offices for the ſailors, who land there. Now it happened, that ſome of theſe miſerable wretches were employed in waſhing the linen and clothes of thoſe men who had had the diſtemper: whereupon, they were ſeized with it, and it raged among them with ſuch violence, that moſt of them periſhed under it. But as ſoon as fatal experience had convinced this ignorant people, that the diſeaſe was ſpread by contagion, it appeared, that they had natural ſagacity enough to defend themſelves. For they contrived to draw lines round the infected part of their country, which were ſo ſtrictly guarded, that, if any perſon attempted to break through them, in order to fly from the infection, he was immediately ſhot dead. Now this fact ſeems the more remarkable, as it evinces, that neceſſity compelled a people of the moſt groſs ignorance and ſtupidity to take the ſame meaſure, which a chain of reaſoning led us formerly to propoſe, in order to ſtop the progreſs of the plague [1]; and which, ſome time after, had a happy effect, not only in checking, but even entirely extinguiſhing that dreadful calamity in France, where it broke forth, and threatened the reſt of Europe with deſtruction.

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[k] Hiſt. Æthiop. lib. iv. cap. 7.

CHAP. II.

Of the nature and ſorts of the Small-Pox.

HAVING ſufficiently proved, in the preceding chapter, that the Small-Pox is a diſeaſe of the peſtilential tribe; in order to a clearer knowledge of its nature, I will briefly premiſe my notions of peſtilence.

All fevers, which attack the whole body, may be conveniently ranged under the three general heads of ſimple, putrid, and peſtilential.

Simple fevers ariſe from a long-continued exceſs of velocity in the motion of the blood, and its conſequences, a diſturbance of its due mixture, and an interuption of the ſecretion of the humours in the ſeveral parts of the body.

Putrid fevers are cauſed, when, together with a concurrence of theſe circumſtances, a lentor enſues in the capillary blood-veſſels; and as this ſizy blood is gradually puſhed forward by the force of the circulation into the veins, it there becomes putrid and impregnates the reſt of the maſs with a malignant quality, which is communicated both to the internal and external parts of the body.

Peſtilential fevers, in fine, I call all thoſe, which are accompanied with ſome ſort of poiſon. Now, of whatever nature this happen to be, it not only infects and corrupts the blood, but more particularly ſeizes on the ſubtile nervous liquor, which is called the animal ſpirits. Hence it is, that theſe fevers act with greater rapidity and violence, and are much more fatal than the other ſorts. But this one circumſtance is common to all fevers, that nature endeavours to conquer the diſeaſe, by raiſing ſome ſtruggle or other, in order to throw forth from the body whatever is prejudicial to life.

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[1] Diſcourſe on the Plague, part ii chap 2.

Now, whereas the word nature is made uſe of by phyſicians in the cure of all diſeaſes, I will here, once for all, plainly declare my ſentiments of what we ought to underſtand by that word. That there is ſomething within us, which perceives, thinks, and reaſons, is manifeſt beyond contradiction; and yet the nature of that ſomething cannot be fully and perfectly comprehended in this life. Wherefore I ſhall reſign the diſquiſition of this point to thoſe, who, while they know too little of, and care leſs for things falling under their ſenſes, take great pleaſure in inveſtigating thoſe things, which human reaſon is incapable of conceiving. However, thus far the ſoundeſt philoſophers agree concerning it, that it is ſomewhat incorporeal. For how can ſluggiſh matter, which is of itſelf void of all motion, be the ſource and firſt cauſe of thought, the moſt excellent of all motions? Wherefore, it is ſufficiently evident, that this firſt mover within us is a ſpirit of ſome kind or other, intirely different and ſeparable from terreſtrial matter, and yet moſt intimately united with our body.

Moreover, to me it ſeems probable, that this active principle is not of the ſame ſort in all; that the Almighty Creator has endowed man with one ſort, and brutes with another: that the former ſo far partakes of a divine nature, as to be able to exiſt and think after its ſeparation from the body; but that the latter is of ſuch an inferior order, as to periſh with the body. The former was by ſome of the antients called animus, the latter anima [m]; and they believed, that they were both ingendered in our ſpecies: but this I take to be an erroneous poſition. For as their anima ſuffices for the functions of life in brutes, ſo our animus ſtands not in need of ſuch an aſſiſtant. Now this matter, if I am not miſtaken, ſtands thus: ſuch is the compoſition of our fabrick, that, when any thing pernicious has got footing within the body, the governing mind gives ſuch an impulſe to thoſe inſtruments of motion, the animal ſpirits, as to raiſe thoſe commotions in the blood and humours, which may relieve the whole frame from the danger in which it is involved. And this is done in ſo ſudden a manner, that it ſhould ſeem to be the effect of inſtinct, rather than voluntary motion; though it be effected in us at the command of the animus, and in brutes by the power of the anima. And indeed, thoſe very motions, which are commonly called natural and vital, as thoſe of the heart, lungs, and inteſtines, which perſevere through the whole courſe of life, even when the will cannot be concerned in them; as they have their beginning from the mind, ſo they are perpetually under its direction. I could eaſily bring many arguments in confirmation of theſe ſentiments, but they would be ſuperfluous in this place. Beſides that I am happily anticipated by the learned and ingenious Dr. Porterfield, fellow of the royal college of phyſicians at Edinburgh, who in a curious diſſertation publiſhed ſome years ſince[n], has treated this ſubject with ſuch perſpicuity, that there can be no room left for doubt.

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[m] Juv. Sat. xv. 148. *Mundi*
Principio indulſit communis conditor illis
Tantum animam, nobis animum quoque.
Vide etiam Daviſii Not. ad Ciceron. Tuſc. diſput. lib. i. cap. 10.

But from philoſophy I return to medicine. Our ſagacious Sydenham was ſo far of this opinion, as to aſſert, that a diſeaſe is nothing elſe but an effort of nature to throw off the morbifick matter, for the health of the patient[o]. And Hippocrates, in his uſual manner, laconically expreſſed the ſame thing thus, Nature is the cure of diſeaſes[p]. Now this I have obſerved more particularly in peſtilential fevers, in which the violence of the diſtemper breaks forth on the ſkin in the form of puſtules, carbuncles, and buboes; all which are the very venom of the diſeaſe, as the common experiment of giving the Small-Pox by inoculation plainly demonſtrates. Thus having made it appear, that the Small-Pox is an envenomed fever, I come to explain its different ſorts; for as to its hiſtory, I refer to Doctor Sydenham, who was the firſt that divided its whole courſe into certain ſtages, and gave the method of cure in each.

Moſt authors divide the Small-Pox into the diſtinct and confluent ſorts, and eſtimate both ſorts by the ſize, number, and manner of eruption of the puſtules. But in the prognoſtick, they make ſo wide a difference between them, that they pronounce the former ſort to be almoſt void of all danger, but the latter always dreadful in its conſequences. Thus much indeed is moſt certain, that the confluent ſort are, generally ſpeaking, much worſe than the diſtinct, and that many more die of thoſe than of theſe. But yet it ſometimes happens, that a diſtinct ſort may prove more dangerous than the common confluent ſort. Moreover, there are many ſymptoms extremely dangerous, which are peculiar to the diſtinct kind, as I ſhall ſhew anon. For the danger does not ſo much ariſe from the quantity of the purulent matter, as from other circumſtances, which ſhall be explained in their due place.

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[n] Vid. Medical Eſſays publiſhed at Edinburgh, vol. iii. Eſſay xii. and vol. iv. Eſſay xiv.

[o] Obſervation. medic. circa morborum acutorum hiſtoriam, at the beginning.

[p] Νούσων φύσιες ἰητροί. Epidem. lib vi.

Wherefore, in my opinion, the Small-Pox may more accurately, and agreeably to the nature of the diſeaſe, be divided into ſimple and malignant.

I call ſimple all that ſort, in which the eruption is attended with a ſlight fever of ſhort duration, the puſtules fill kindly, make good matter in a few days, and in fine, fall off in dry ſcabs.

The malignant ſort is that, in which the eruption appears with a malignant fever, the puſtules hardly come to any tolerable degree of maturity, and either ſuppurate not at all, or if they do in ſome meaſure, as the fever is never off, it is with great trouble that they at length end in little cruſts.

That malignity appears in ſuch various forms, according to the different nature of the puſtules, that its characteriſtick ſigns have given various appellations to the Small-Pox: Whereof the chief differences, which have fallen under my obſervation, are theſe that follow. For the puſtules are either cryſtalline, warty, or bloody. I am well aware, that authors have run into a greater number of ſubdiviſions; but I look on the reſt to be either a combination of ſome or all of theſe, or only different degrees of the ſame kind: A thing which frequently happens in an irregular diſeaſe.

I call thoſe puſtules cryſtalline, which, inſtead of thick, well-digeſted matter, contain nothing but a thin, pale water, and are in ſome meaſure pellucid. And this ſort is ſometimes obſerved, not only in the confluent, but alſo in the diſtinct Small-Pox.

They are called warty, when the puſtules contain no fluid, but grow hard and prominent above the ſkin in the manner of of warts. Theſe are peculiar to the diſtinct ſort.

The bloody puſtules are produced more ways than one. For I have ſeen caſes, where, at the very beginning of the diſeaſe, the puſtules were ſo many ſmall tubercles full of blackiſh blood, reſembling thoſe raiſed on the ſkin, when pinched with a forceps. And theſe were followed by an intermixture of purple and livid ſpots, ſuch as phſiycians deſcribe in the true plague. But it more frequently happens, that puſtules coming out very thick, on the third and fourth day after, when they ought to fill, become livid, and a little bloody, with black ſpots ſpread over the whole body; which forbode death in a day or two, becauſe they are real gangrenes. It very often falls out at this time, that a thin blood flows not only out of the patient's mouth, noſe, and eyes, but alſo by every outlet of the body; but more eſpecially by the urinary paſſages, through which it likewiſe iſſues ſometimes on the firſt days of the diſtemper. Theſe are manifeſtly of the confluent ſort.

To theſe Dr. Freind[q] has added a fourth kind of Small-Pox, which he calls ſiliquoſe, in which the puſtules reſemble little round, ſoft, hollow bladders, and contain no fluid. But this I place among the cryſtalline ſort, the only difference between them being, that in this caſe one part of the fluid, which had been thrown into the puſtules, flies off through the ſkin, and the other is abſorbed by the lymphaticks back into the body.

It is always a difficult task, and ſometimes a needleſs one, to inveſtigate the true cauſes of things. But as the publick may perhaps expect, that I ſhould account for the above-mentioned differences in this diſeaſe; I ſhall ſay, that the principal reaſons of theſe differences, which have occurred to me upon mature conſideration, are, the almoſt infinite variety of temperaments in various individuals; the ſeaſons of the year and their changes, and in fine, many accidents which befal the body, between the time of catching the infection and the appearance of the diſeaſe. For inoculation ſhews, that the Small-Pox does not break forth before the eighth or ninth day from receiving the infection.

Poſſibly it may be thought ſtrange, that, in enumerating theſe cauſes, I have not mentioned a word of the nature of the infecting particles. But, beſides that the knowledge of this is not attainable by us, it ſeems to have no great influence on the production of this or that particular ſort of the diſtemper. For we frequently obſerve, in the ſame family, where one perſon catches it from another, that ſome have a favourable, and others a bad ſort.

But ſuch is the power of temperaments of body, that they deſcend to thoſe of the ſame blood by a ſort of hereditary right: Whence ſome diſeaſes are found to be familiar and fatal to certain families.

[q] Epiſt. De quibuſdam variolarum generibus.

As to the ſeaſons of the year, we find, by daily experience, that ſome of them are fitter to produce certain diſeaſes than others; that they are the cauſes of epidemick fevers; and that thoſe chiefly, in which ſome fluid is to be thrown off by the ſkin, are the moſt remarkably liable to be affected by their changes.

But numberleſs are the things comprehended in the third article, to wit, all thoſe accidents, which happen to the body from the time of taking the infection to the eruption of the puſtules. For the poiſon is far from lying quiet all this while, but is conſtantly and gradually exerting its malignity, by firſt corrupting the animal ſpirits, and then the whole maſs of blood and humours. Wherefore, if bodily exerciſe, diet, or the affections of the mind (which have great power in this caſe) ſhould happen to make any particular alteration in the fermenting fluids, they may eaſily occaſion various ſorts of puſtules, poſſibly in the manner I am going to explain.

The ſimple Small-Pox are ſuppurations made, while the blood is not ſo far vitiated, but that the derivations of the humours into the proper parts may be affected tolerably well, and the natural functions are not entirely hurt. But in the malignant ſort the caſe is quite different. For the whole maſs of humours is corrupted more or leſs, according to the nature of the diſeaſe; and the blood is in ſuch confuſion, that the purulent matter cannot be thrown upon the ſkin. Now, in this caſe, ſometimes a thin fluid is thrown out, which, when watery, makes cryſtalline puſtules; when thick and viſcid, warty; and ſiliquoſe, in fine, when the fluid has been reſorbed by the lymphaticks into the blood, and has left the puſtules quite empty. Beſides, the texture of the blood is too frequently broken to that degree, that it is obſtructed, and ſtagnates in the ſmall veſſels: Whereupon, the ſkin is ſtrewed with black ſpots, which are ſo many real gangrenes, and hemorrhages enſue through all the outlets of the body; whence this is called the bloody ſort. That theſe horrid ſymptoms are the effects of an acrid poiſon, appears plainly; becauſe the ſame happen to thoſe, who have been bit by the hæmorrhois, a Lybian ſerpent, according to Lucan's beautiful deſcription:

A fierce hæmorrhois ſtruck both his fangs,
Deep into Tullus ; a brave valiant youth,
And fond admirer of great Cato's worth.
And as Corycian ſaffron, when 'tis ſqueez'd,
Pours forth its yellow juice through all the holes
Of the hard preſſing boards ; ſo from the pores
Of all the parts flow'd ruddy venom'd gore.
His tears were bloody ; nature's paſſages,
For their own humours, were all fill'd with blood.
His mouth, his noſe, choak'd up with filthy clots:
Red ſweats tranſpir'd from all the ſkin inflam'd.
His body ſeem'd one univerſal wound[r].

But from theſe objects of terror, it is time to paſs to thoſe which may afford comfort.

CHAP. III.

Of the methods of cure in the Small-Pox.

IT is moſt evident, that all peſtilential diſeaſes are accompanied with the higheſt inflammation of the blood and humours, and therefore they all require emptying and cooling. I begin with the ſimple Small-Pox, and ſhall afterwards deſcend to the treatment of the malignant ſort in its ſeveral varieties.

But in this place it ſeems proper to clear up two material points. The one regards the management of the ſick, and the other, the diet proper for him.

With reſpect to the firſt, ſerious attention ſhould be given both to the ſeaſon of the year, and to the ſtrength of the patient. For the ſame things, that are done with ſafety in ſummer, may be attended with danger in winter; and young lads or robuſt men eaſily bear what might deſtroy infants, or weakly women. But let this be a general rule, to keep the patient in bed during the firſt days of the diſtemper, taking care to defend him from the inclemency of the winter by proper means, and to moderate the exceſſive heat in ſummer by cool air. But to chill and as it were to freeze up the ſick in winter, is not the part of a prudent phyſician, but that of a fool-hardy empirick, trying experiments at the expence of unhappy people's lives. Wherefore a mean is to be obſerved herein, by managing the patient in ſuch a manner, as neither to ſtifle him with heat or clothes, nor check the eruption and perſpiration by cold. However, great care ought to be taken in general, to ſupply him with pure and cool air, which he may take in plentifully: becauſe a hot air cauſes difficulty of breathing, checks the ſecretion of urine, and increaſes the number of puſtules on the internal organs of the body; the conſequences whereof we may juſtly apprehend to be inflammations, and, towards the end of the diſeaſe, gangrenes.

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[r] Lib. ix. ver. 806.

With regard to diet, it ought to be very ſlender, moiſtening, and cooling; ſuch as oatmeal or barley-gruel, &c. Nevertheleſs, as the food is to be adapted to the ſeveral ſtages of the diſeaſe, the beſt regimen in the beginning is that, which will keep the body open, and promote urine. Theſe advantages are obtained by boiling preſerved fruits with their food, eſpecially figs, damaſcene plumbs, and tamarinds; and giving them ſubacid liquors for drink; as ſmall-beer acidulated with orange or lemon juice; whey turned with apples boiled in the milk, or with wine; emulſions made with barley-water and almonds; Moſelle or Reniſh wine plentifully diluted with water; or any other things of this kind.

When this ſort of diet did not keep the body open, the Arabian phyſicians added manna to it; but this they did ſparingly, and with caution. For it is quite neceſſary, ſays Avicen, that the body be open in the beginning [s]. Which is one of the moſt important advices, that can be given in this diſeaſe, if to it be added, that urine muſt be made plentifully. For there is a wonderful correſpondence between the skin and the kidneys; whereby, whatever fluid is wont to be ſecreted by the cuticular glands, may with great eaſe be evacuated by the urinary paſſages. Wherefore it is very proper to draw off as much of the matter of the diſeaſe as can be done, by theſe paſſages, in order to prevent the overloading of the internal parts.

Now let us paſs on to medicines, and, in the firſt place, blood-letting is neceſſary. But as diſſentions frequently ariſe on this ſubject, ſome rules are to be laid down concerning it.

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[s] De variolis & morbillis.

It is agreed on all hands, that this remedy is not very ſuitable to the tendereſt age. But yet, as the blood of infants is generally too thick, and too much in quantity for the bulk of the body ; and as they are oft-times ſeized with convulſions, upon the appearance of the diſeaſe, ſome evacuation ought to be made : Which may be ſafely effected by leeches applied to the temples, or behind the ears Likewiſe, if blood cannot be drawn from the arm, in moſt young ſubjects either of the jugulars may be opened without inconvenience.

That regard is to be had to the patient's ſtrength of what age ſoever, is manifeſt to all. But the weakneſs is ſeldom ſo great, as not to bear ſome loſs of blood, unleſs it be after ſome extraordinary evacuations. Nor is the pulſe to be overmuch depended on in this caſe : For it often happens, that the thickneſs of the blood prevents the ſecretion of the uſual quantity of animal ſpirits in the brain, and that the vital fluid is not propelled from the heart with due force : In which caſe, by removing the oppreſſion, the patient's ſtrength is obſerved even to increaſe with the bleeding.

But in what proportion blood is to be taken away, will be beſt determined by the vehemence of the diſeaſe. Many of our phyſicians imagine that they have done their duty, when they have ordered one bleeding, and are vaſtly cautious of opening a vein at all, after the firſt appearance of the puſtules, for fear of checking the eruption. But this is certainly an ill-timed caution : For in youths and adults it is often neceſſary to draw blood two or three times, only with an intermiſſion of two or three days between each time. And indeed blood-letting is ſo far from being an obſtacle to the eruption of the puſtules, if the patient be not too weak, that it forwards it conſiderably ; and for the very ſame reaſon, that, in large abſceſſes, when there is too great a fullneſs, and the heat too intenſe, the ſuppuration is brought on quicker and better by taking away ſome blood.

I have often obſerved, when in the beginning a vaſt number of ſmall puſtules foreboded a diſeaſe of the worſe kind, that the face of affairs was ſo remarkably changed upon one or two bleedings, that the puſtules increaſed in ſize, and diminiſhed in number (the greatneſs of the diſeaſe thus giving way to the greatneſs of the remedy) by which means nature acquired ſufficient ſtrength to expel the noxious humour. For it is moſt certainly true, that nature labours at the expulſion of the poiſon in the moſt perfect manner, that is, endeavours to make the puſtules fill up as much as poſſible ; and for that end ſhe requires every thing to be quiet within the body, and always abhors confuſion. And indeed, the reaſon why the confluent Small-Pox is worſe than the diſtinct ſort is not, becauſe the matter of the diſeaſe is more abundant in the former than in the latter, but becauſe it is not puſhed out in a proper manner. For upon a ſtrict examination we generally find, that the greater quantity is diſcharged in the diſtinct ſort.

Now to conclude this head, ſuch is the benefit of large and reiterated bleeding, that it is obſerved to prevent thoſe evils, which often attend the diſeaſe; as a delirium, convulſions, difficulty in breathing, and the like. For the diſſection of dead bodies ſhews, that the infection is not confined to the external parts of the body, but ſeizes on the internal parts alſo. For I myſelf have ſeen ſubjects, in which the lungs, brain, liver, and inteſtines were thick beſet with puſtules. Nor have I the leaſt doubt, but that thoſe ſudden deaths, which ſometimes happen towards the end of the diſeaſe, when there ſeemed to be no room left for fear, are occaſioned by the efflux of the purulent matter from the burſting puſtules on one or other of the nobler parts. Wherefore, no fever is attended with more uncertain ſigns, on which to ground a ſure prognoſtick, than this, of which we are treating. Upon the whole, there is no time of the diſeaſe, wherein it may not be neceſſary to draw blood; if the violence of the fever require it, and the patient appear able to bear it. For it is always better to try a doubtful remedy than none.

A phrenzy, coming on the fourth day of the eruption, is juſtly eſteemed a very bad omen; inſomuch that Dr. Freind ſays, that he never ſaw a patient recover, who had had this ſymptom [t]. But I can poſitively declare, that I have had better fortune; having recovered many, who had been ſeized with a delirium at that time, by drawing blood immediately, and then throwing in a clyſter.

After taking away as much blood as is requiſite, it is proper to purge the body; which may be done with ſafety enough, any time before the eruption of the puſtules. But the purge muſt be of the gentle kind; ſuch as the infuſion of ſena with manna, or manna alone, eſpecially for children. For no diſturbance is to be raiſed in the body. But firſt a vomit ſhould be given, if there happens to be any collection of phlegm or bile in the ſtomach, or the ſtomach to be loaded with food unſeaſonably taken.

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[t] Epiſt. de quibuſdam variolarum generibus.

As ſoon as it is certain, that the eruption is near at hand, moſt phyſicians are of opinion, that it ought to be promoted by all means. Yet we are to remember, that this is the proper work of nature; and therefore great care ſhould be taken, neither to increaſe the motion of the blood over-much, nor ſuffer it to grow languid.

It was a wiſe ſaying of Aſclepiades, that he made uſe of the fever for its own cure[u]: whereby he meant, that the fever is to be regulated in ſuch a manner, that itſelf may throw off whatever is noxious to the body. Wherefore the true intention in this caſe, is to keep the inflammation of the blood within due bounds, and at the ſame time, to aſſiſt the expulſion of the morbifick matter through the ſkin. For both which purpoſes a medicine, which I have experienced to be uſeful, is a powder compoſed of two parts of the bezoardick powder, and one part of purified nitre; and ſometimes of equal parts of both. An adult may take half a drachm of this powder three or four times in a day, diminiſhing the quantity for children, in proportion to their age. And if the efferveſcence of the blood run very high, a proper quantity of ſpirit of vitriol may be added to the patient's drink. But if there be any keckings or reachings to vomit, they will be removed by draughts containing half an ounce of juice of lemons, with one ſcruple of ſalt of wormwood.

Now, concerning thoſe medicines which eaſe pain, and procure ſleep, in this ſevere diſeaſe, theſe are not to be uſed over-haſtily: for all anodynes in ſome meaſure obſtruct the ſeparation of the morbid humour from the blood, unleſs the pain happens to be exceſſive: and moreover, if the violence of the fever has raiſed a delirium, they generally make it worſe. Wherefore, it is not proper to employ them, until the eruption of the puſtules be compleated; but after that, narcoticks may be adminiſtered with ſafety. Thus it will be right to give the patient a doſe of the thebaick tincture, or diacodion, every evening, eſpecially if he be a youth or an adult perſon; for theſe medicines agree not ſo well with infants. And ſometimes, in caſes of very great inquietude, the doſe is to be repeated in the morning. For the ſuppuration of the matter, ſtagnating in the puſtules, is forwarded by quiet and ſleep. But if, towards the end of the diſeaſe, the patient happens to be ſeized with a ſhortneſs of breath, or danger of choaking from viſcid ſlime, theſe medicines are to be intirely prohibited. In the mean time, if the patient is coſtive, which is generally the caſe, and the fever continues, the body is to be opened with a clyſter every ſecond or third day.

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[u] Celſ. lib. iii. cap. iv.

It may be needleſs to obſerve, that, if this method is proper in the diſtinct Small-Pox; it will be found more neceſſary ſtill in the confluent, which is attended with greater fear and danger.

From the ſimple I now paſs to the malignant Small-Pox, of which I have already eſtabliſhed three ſorts, to wit, the cryſtalline, the watery, and the bloody.

Now, this obſervation holds good in all kinds of the diſeaſe, that the more the puſtules tend to ſuppuration, the greater are the hopes of recovery; and therefore, when that does not go on according to our wiſhes, all poſſible means are to be employed to throw the morbifick humour on the ſkin; with which intention every thing is to be done in this caſe, which we have propoſed in treating of the ſimple ſort. But yet each ſpecies of the malignant ſort requires a peculiar conſideration.

Whereas, in the cryſtalline ſort, the water of the puſtules can never be brought to a laudable ſuppuration; it ought to be carried off by thoſe paſſages in the body, which are naturally adapted to the ſecretion of the thinner fluids. Now I have ſaid above, that there is a great correſpondence between the ſkin and the kidneys. Therefore, while the thinneſt parts of this water are made to tranſpire through the ſkin, the groſſer parts ought to be drawn off through the urinary paſſages, by diuretick medicines. Of this tribe there is nothing better than nitre, and that may be adminiſtered three or four times a day, in ſuch quantities as may not offend the ſtomach, to wit, a ſcruple, or half a drachm, diſſolved in ſmall wine, which is the only ſort that agrees with this diſeaſe, till towards the end; when it may be proper to allow the patient a little Canary (Dr. Sydenham's favourite liquor) or any other ſoft and generous wine to ſupport his ſtrength. But while nitre is thus taken, it will be right to interpoſe thoſe medicines, which cheriſh the heart, and promote the flux of the humour into the puſtules: ſuch as Raleigh's cordial, or the cordial confection: the bezoardick powder, ſometimes with a little ſaffron; and the plain ſpirit of hartſhorn. Beſides theſe, on the fifth or ſixth day of the eruption, bliſters are to be applied between the ſhoulders, and to the arms and legs: for which purpoſe, the bliſtering epithem is moſt convenient, as its ſoft conſiſtence enables it to reach the ſkin between the puſtules, and ſtick to it. For by this diſcharge of the ſeroſities, the fever, which encreaſes, when there is no farther derivation of humours to the ſkin, is ſeaſonably prevented.

I know indeed, that moſt of our phyſicians apply this remedy earlier, and even on the firſt days of the diſeaſe, in every malignant Small-Pox; but there is juſt reaſon to fear, that the great commotion raiſed in the blood by the acrimony of the flies might be an obſtacle to the due propulſion of the humour into the beginning puſtules.

The watery Small-Pox is more dangerous than the cryſtalline; becauſe the matter of the diſeaſe, being too thick, can neither ſuppurate, nor paſs off by urine. Wherefore it is neceſſary to uſe the utmoſt endeavours to take off the fever, and to provoke ſweat, in order to digeſt the morbid humour, by the cordial medicines afore-mentioned. And bliſters ought to be applied in this caſe likewiſe. But the Arabian phyſicians pronounced this ſort of the diſeaſe to be always fatal [x].

Laſtly, that ſort, which I have called the bloody Small-Pox, requires peculiar attention. Now in this ſort, if there is any room for phyſick, thoſe medicines bid faireſt for ſucceſs, which by their ſtypticity thicken the blood in ſome meaſure, and ſo check it, that it cannot break through even the ſmalleſt arteries. The beſt of this kind are the Peruvian bark, alum, and that ſpirit which is called oil of vitriol. Now theſe are to be uſed alternately in this manner. A drachm of the bark may be given every ſixth hour; and, three hours after, a proper quantity of alum. It will be a very powerful medicine, if thus compounded. Melt three parts of alum on the fire, with one part of that inſpiſſated juice, which is improperly named dragon's blood: when the maſs is grown cold, reduce it to a powder; a ſcruple of which, made into a bolus with conſerve of red roſes, will be a proper doſe. The moſt convenient manner of giving the oil of vitriol, is in the tincture of roſes; five or ſix ſpoonfuls whereof may be taken ſeveral times in the day. And beſides, the patient's common drink may be acidulated with it; eſpecially, if purple or black ſpots appear interſperſed among the puſtules. And this medicine will be of great ſervice, not only in the bloody, but in all the other ſorts likewiſe, accompanied with theſe ſpots. This one thing more I will add, that I have experienced the uſe of bliſters to be ſafe enough in this caſe, when a delirium requires their application. I have indeed ſeen ſome patients recovered by this method, who had diſcharged large quantities of blood by the urinary canal at the time of the eruption of the puſtules; but it is worthy of notice, that, in all theſe, the diſeaſe terminated in ſome conſiderable evil. For they were tortured, either with boils breaking out in many parts of the body, or with glandular ſwellings under the ears or arm-pits, which were not eaſily brought to ſuppuration. I likewiſe remember the caſe of a young man, one of whoſe tonſils was deſtroyed by a gangrenous ulcer which was very troubleſome to cure. Thus upon the whole it is manifeſt, that it is extremely difficult to clear the maſs of blood of this poiſon; and that a perfect recovery is not to be procured without a ſuppuration, either in its due courſe of time, or in the laſt ſtage of the diſtemper.

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[x] See Rhazes's treatiſe annexed, chap. viii.

But in every ſort of this diſeaſe, it is proper to open the body on the decline, that is, on the ninth or tenth day from the eruption; becauſe a putrid fever generally comes on about this time, while the puſtules are drying; or upon the ſubſidence of the ſwelling of the inflamed ſkin, where there is no ſuppuration; which fever cannot be taken off with equal ſafety by any other means. But gentle catharticks alone are to be employed in this caſe, ſuch as I have adviſed before the eruption of the puſtules.

This whole affair I formerly explained, and illuſtrated with proper examples, in my letter to Dr. Freind [y]; and that gentleman likewiſe, abundantly confirmed it afterwards, by the authorities of antient and modern phyſicians. So that whoſoever refuſes his aſſent to this practice, muſt reſolve not to ſee at noon-day. All fevers have their certain periods; and where the poiſonous matter has once infected the humours, the putrid fuel of the diſeaſe can hardly be thrown out of the body early enough. And indeed, when this rule is not obſerved, we daily ſee the diſtemper followed immediately by a hectick fever, attended with a cough, ſpitting of purulent matter, ſhortneſs of breath, and other ſymptoms of the lungs being affected.

But I muſt obſerve in this place, that, however beneficial purging may be at this time; yet, if the body happens to be too looſe, either from the natural ſtate of the inteſtines, or by frequent clyſters, this remedy becomes leſs neceſſary, or at leaſt, may be poſtponed for ſome days. For great regard is to be paid to the patient's ſtrength, which the length of the illneſs has more or leſs impaired.

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[y] Vid. Freind. Commentar. vii. ad Hippocrat. de morbis popularibus. Et Epiſt. de purgantibus in ſecunda variolarum febre adhibend.

Moreover, it is requiſite to be very circumſpect, whether there be any remains of the purulent matter lurking under the withered ſkin of the puſtules; for this is ſometimes ſo manifeſtly the caſe, that though the ſcabs appear dry and hard; yet upon ſome of them breaking here and there, there iſſues forth very fetid matter. In this circumſtance, the body is not to be purged, but rather to be ſupported by proper diet, until the matter is all come away; which I have ſeen continue running to the twenty-fourth day of the diſeaſe, and yet the patient recovered. I ſhall never forget the caſe of a certain young man of a very robuſt conſtitution, who had ſo dreadful a ſort of the confluent Small pox, that when the puſtules ſhould have ripened, his whole face was become black and dry, and in ſhort, thoroughly mortified. As the caſe ſeemed quite deſperate, I ordered inciſions to be made to the quick in many places, and fomentations of a decoction of emollient and warm plants, with the addition of camphorated ſpirit of wine, to be applied to the parts: whereupon there followed a diſcharge of matter from the inciſions of ſo offenſive a ſmell, that none of the attendants could bear to ſtay in the room; and having at the ſame time promoted this diſcharge by proper digeſtives, and duly purged him, he at length recovered. But his mangled face bore the laſting marks of the malignity of the diſtemper, and of the goodneſs of the cure.

In fine, it will be of uſe at this time to take away ſome blood, if the heat be too great, and the patient have ſtrength enough left to bear it.

Whoſoever thoroughly conſiders all the circumſtances of this ſubject, which I have hitherto explained, muſt juſtly wonder how the learned Dr. Boerhaave could be induced to hope, that ſome time or other, a ſpecifick antidote may be found againſt this contagious poiſon [z]; that is, by which it may be ſo thoroughly deſtroyed, that though it had been received into the body, it may not produce the diſeaſe. But the principles and elements of things are ſo certain, and ſo well eſtabliſhed by the permanent laws of nature, that whoſoever would endeavour to change them, would act like thoſe philoſophers by fire (as they ſtyle themſelves) who labour hard to tranſmute the baſer metals into gold; and when continual diſappointments have convinced them of the vanity of their hopes, actually extract gold out of the purſes of the ignorant and credulous by the fumes of their charcoal.

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[z] Aphor. de cognoſcendis & curandis morbis, 1390, 91, & 92.

This one obſervation I muſt add, that there is no ſpecies of ſever, which requires the body to be thoroughly cleared of the remains of the diſeaſe, more than this. Wherefore, upon the patient's recovery, blood is to be drawn, if his ſtrength will bear it; and cathartícks are to be given ſeveral times at proper intervals. After which, the body is to be reſtored to its former ſtate by a courſe of milk, eſpecially that of aſſes, with ſuitable food, and the air and amuſements of the country.

I ſhall cloſe this long chapter with the account of a very malignant Small-Pox in a youth of fifteen years of age, communicated to me by my ſon-in-law, the learned and ingenious Dr. Wilmot; who, from the fifth day of the diſeaſe, attended the patient jointly with Dr. Connel.

In the beginning of the fever preceding the eruption, the patient was directed to be let blood, and to take a vomit, and the next morning a gentle purge: the day following, the Small-Pox fluſhed out. The puſtules were very numerous and ſmall all over the body, looking more like a rank Meaſles than the Small-Pox. As his fever ran very high, he was ordered draughts of Gaſcoign's powder with nitre, to be taken every ſix hours; and to drink plentifully of barley-water acidulated with ſpirit of vitriol.

On the fourth day of the eruption, as he was very delirious, in order to procure ſleep, a paregorick of ſix drachms of diacodion was given him, which did not produce the effect.

The fifth day, there was not the leaſt ſwelling of the face; his pulſe was quick and full, his heat intenſe, and the delirium not abated. Wherefore he was ordered another bleeding; the nitrous draughts were continued, with the addition of five grains of myrrh to each; as likewiſe barley-water with ſpirit of vitriol, and the paregorick as before.

The ſeventh, the appearance of the diſeaſe was ſtill the ſame, with the addition of an oppreſſion of his breath, and a very troubleſome dry cough. Diaſcordium was added to his nitroſe draughts, and he was ordered a ſolution of gum ammoniack to be taken, a ſpoonful at a time, as occaſion required; and the paregorick continued.

The eighth, he complained much of a moſt acute pain in his head; his ſhortneſs of breath and cough were increaſed, his pulſe low, and there were no ſigns of ſuppuration; nor the leaſt ſwelling in the face or hands: but the ſkin of his face looked like a piece of parchment. Bliſters were ordered to be laid on his arms and legs, and plaſters, made of equal parts of the cephalick and bliſtering plaſters, to be wrapt round his feet: likewiſe draughts containing of mithridate half a drachm, and of volatile ſalt of amber half a ſcruple, to be taken every ſixth hour; and a gargle of pectoral decoction, and oxymel of ſquills.

The tenth, as every thing was grown worſe, beſides continuing the ſame medicines, bliſters were ordered below the elbows.

The eleventh, his pulſe being much lower, and the patient weaker, a mixture with Raleigh's confection was ordered to be taken often by ſpoonfuls, and the other cardiacks continued.

On the twelfth, the pulſe being ſcarcely perceptible, and his breath oppreſſed to the laſt degree; when all hopes of ſucceſs were given up, a fit of coughing, in which he was almoſt ſuffocated, brought on a ſpitting of a limpid, fetid humour, equal in quantity to a ſalivation raiſed by mercury. And this flux continued twelve days without any apparent abatement: from thence it gradually diminiſhed for four days, when it ſtopped entirely.

By the ſixteenth day, the diſeaſe, together with that diſcharge, had ſo far exhauſted him, that he was ſcarce able to turn in his bed: and yet his ſpirits were ſo much better, that he could take plentifully of liquid nouriſhment. Whereby gathering ſtrength, his fever had now the appearance of a hectick only; for which he was ordered to loſe five ounces of blood, to take draughts of lemon-juice, and ſalt of wormwood, with a little ſperma ceti diſſolved in them, every four hours, and to drink aſſes milk every morning.

By this method, with the repetition of bleeding to five ounces two or three times, and now and then purging him gently with rhubarb; together with elixir of vitriol in Briſtol-water, and the country air, he in time happily recovered.

In this caſe we have a moſt remarkable inſtance of what I have already ſaid more than once, that is, how ſolicitous nature always is, at any rate, to expel the poiſonous matter of this diſeaſe out of the body.

CHAP.

C H A P. IV.

Of accidents in the Small-Pox.

MANY ſymptoms and circumſtances attend the Small-Pox, which, as they neither commonly occur, nor ſeem to depend on the nature of the diſeaſe, either affright, or perplex the phyſician. Wherefore it may not be improper to make ſome remarks concerning them.

Sometimes the patient is ſeized with convulſions, juſt before the eruption. But this ſymptom is more terrifying than dangerous; and in children particularly, thoſe convulſions, which frequently come on before the diſtemper appears, are generally rather a good, than a bad ſign. Now in this caſe, though it may ſeem ſtrange, blood-letting is to be carefully avoided; but a bliſter is to be applied to the neck, and to the ſoles of the feet plaſters made of equal parts of the cephalick and bliſtering plaſters: not forgetting at the ſame time to give thoſe medicines inwardly, which experience has ſhewn to be antiſpaſmodick. Of theſe the chief are, wild valerian root, Ruſſian caſtor, and the ſpirits and volatile ſalts, chemically extracted from animals. For it has been frequently obſerved, that, upon drawing blood in this caſe, the diſeaſe ended fatally. I can aſſign no other reaſon for this event, but that thoſe involuntary motions are occaſioned by the patient's weakneſs; which is ſo increaſed by that evacuation, that nature becomes incapable of throwing out the morbid matter upon the ſkin. But the thing is otherwiſe in adults, who, if not too weak, ought to loſe a moderate quantity of blood, and then be put into the foregoing method.

The diſeaſe begins ſometimes in a different, and almoſt contrary manner. For the eruption appears without much fever or pain; for which reaſon there ſeems to be no danger. But that fond ſecurity is very frequently ill-grounded. For at the time when the puſtules ought to tend to maturity, as if nature were lazy, and not attending to her duty, there is no ſuppuration made: hence the fever increaſes, with inquietude of body, anxiety of mind, difficulty of breathing, and a delirium; which carry off the patient in a few days. In this ſtate, the fever ought rather to be raiſed than checked; and therefore warm medicines are to be directed, which promote ſuppuration, by increaſing the motion of the blood, and thinning the humours: ſuch are the Virginian ſnake-root, the contrayerva-root, ſaffron, aſa fœtida, myrrh, and the like. But above all, bliſters muſt be laid on all the limbs. Such is the neceſſity of ſome evacuation or other in this diſeaſe, that if the matter of the infection be over-abundant, as it happens in bad caſes, nature never fails endeavouring to throw off the load. Thus in adults the ſpitting comes on upon the firſt days of the eruption; whereas children, who ſeldom ſpit, have a looſeneſs almoſt through the whole diſeaſe. Both theſe evacuations are of great importance, and therefore as the looſeneſs is not to be inconſiderately ſtopped in children; ſo in adults, if the ſpitting does not go on to our wiſhes, it ought to be promoted by medicines, which ſtimulate the glands of the mouth; eſpecially gargles made of a decoction of muſtard ſeed and pepper, with the addition of oxymel. For in the confluent and malignant Small-Pox, if this flux does not ariſe, and even continue to the end of the diſeaſe, it is a very bad ſign.

Sometimes a ſuppreſſion of urine makes the patient ſuffer great pain, receiving little or no relief from diureticks. In this caſe Dr. Sydenham directed, that he ſhould be taken out of bed, and expoſed to the cool air: which generally has a good effect. But the moſt convenient method will be, to open the body by a clyſter, eſpecially if, the puſtules now appearing, there be any fear of taking cold; and then to inſiſt a little on diuretick medicines; for which purpoſe Glauber's ſalt is particularly uſeful, as it is both laxative and diuretick.

Whenever a woman with child is ſeized with the Small Pox, the phyſician may juſtly dread the conſequences. For he has reaſon to fear a miſcarriage, which expoſes his patient to two ſorts of danger, the one from the new fever, which attends that accident; the other from the loſs of blood, which may bring her very low. And therefore the farther ſhe is advanced in her pregnancy, the greater riſque ſhe runs; becauſe the delivery of a large child cauſes a greater flooding than that of a ſmall one. I can however aſſert from my own knowledge, that a certain woman was delivered of a ſon at the full time, while ſhe was actually labouring under this diſeaſe; and yet both the mother and the child did well; but this is a caſe equally extraordinary and fortunate. But ſtill a good deal depends on the time of the diſeaſe, when the abortion happens: becauſe the weakneſs occaſioned thereby is the more dangerous, the more nearly it coincides with the time of the ripening of the puſtules. Wherefore, if the efflux be more than nature uſually requires, thoſe medicines are to be given, which I have propoſed in the bloody Small-Pox.

Now, whereas theſe caſes fall out various ways, and phyſicians have been divided in opinion concerning ſome of them; it may not be improper to make ſome animadverſions on them ſeparately.

When a woman in the Small-Pox ſuffers abortion, the child moſt commonly comes into the world with the diſtemper on it; but not always. The reaſon of this difference will eaſily be underſtood, by duly conſidering what I have already ſaid concerning infection [a], and comparing it with what I ſhall hereafter ſay concerning the inoculation of the Small-Pox [b]. Whereby it will plainly appear, that the ſeeds of the diſeaſe are ſubtile particles, exhaled from the puſtules come to maturity; which do not produce the effect, till eight or nine days after their entrance into a ſound body. Upon which account, when the child comes into the world, before matter is made in the puſtules on the mother, it has no viſible marks of the diſtemper. And thus it ſometimes happens, that the Small-Pox, which the infant has contracted in the womb, breaks forth on the ſecond, third, or any other day before the eighth from the delivery, whether the child be come to its full time or not; as will appear by the following caſe, which lately fell under my own obſervation.

A lady of quality was, in the ſeventh month of her pregnancy, ſeized with ſo malignant a ſort of the confluent Small-Pox, that there was no appearance of any one favourable ſymptom. For ſhe neither ſpit plentifully; nor did the ſwelling of the hands or feet come on, upon that of the face ſubſiding; nor in fine was ſhe aſſiſted by a flux of urine on the decline of the diſeaſe; but on the contrary, her face was all covered with ſmall pimples, which made little or no matter. In this condition, ſhe was, on the eleventh day of the diſtemper, pretty eaſily delivered of a ſon, who brought no marks of the infection into the world; and ſhe died on the fourteenth day. But in the morning of the fourth day following, the infant was ſeized with convulſions, the forerunners of the eruption, which appeared the ſame day, and he died in the evening. In this caſe it is plain, that ſome ſuppuration having been made, as uſual, on the eleventh day, the diſtemper paſſed from the mother to the child, which was not to break out till eight days after.

But in caſe there is no miſcarriage, the child will be free from the diſeaſe during his whole life; unleſs he happens to be born before the puſtules were come to maturity. For as ſomething naturally inherent in our conſtitution renders the body liable to the infection; ſo, when this debt is once paid to nature, we are ſecure ever after. But the infant in the womb ſometimes catches the diſtemper, without the mother being affected; as I ſhall prove by this remarkable inſtance, which I well remember. A certain woman, who had formerly had the Small-Pox, and was now near her reckoning, attended her huſband in the diſtemper. She went her full time, and was delivered of a dead child. It may be needleſs to obſerve, that ſhe did not catch it on this occaſion: but the dead body of the infant was a horrid ſight, being all over covered with the puſtules; a manifeſt ſign that it died of the diſeaſe, before it was brought into the world. Wherefore, upon the whole, let none entertain the leaſt ſuſpicion, that the ſame perſon can poſſibly have this diſtemper twice. But the reaſon why the body is liable to the infection once, and no more, is to me as entirely unknown, as to the moſt ignorant of mankind. But this I will add, that an infant in the womb may have the good luck to go through the diſeaſe, and yet the marks be quite effaced before the birth [c].

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[a] Chap. i.

[b] Chap. v.

From what we have ſaid concerning abortions, it is eaſy to comprehend what judgment ought to be formed of the monthly evacuations coinciding with the Small-Pox, a circumſtance, at which people are apt to be alarmed. For this evacuation is of the ſame kind with the flooding, which follows upon abortion: and whether it happens at the uſual time, or is brought on irregularly by the extraordinary effervеſcence of the blood; in both caſes it rather affords relief than threatens danger. However, if in either caſe the diſcharge ſhould prove ſo great, as to weaken the patient over-much; it muſt be reſtrained by thoſe medicines, which I have recommended in the bloody Small-Pox, without neglecting to draw blood, if requiſite. But we know by experience, that women have ſometimes uterine diſcharges through the whole courſe of the diſeaſe, without loſs of ſtrength, or any other inconvenience.

The ſame judgment may be formed of hæmorrhages at the noſe, which frequently occur in the beginning of the diſtemper; for they are occaſioned by the rarefaction of the blood in the ſmall veſſels; and therefore, by diminiſhing the heat, are generally more ſerviceable than detrimental, unleſs they run to exceſs.

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[c] Vid. Mauriceau, ſur la groſſeſſe & l'accouchement des femmes, Obſ. 576.

It happens ſometimes, though not often, that the variolous fever is accompanied with a ſingle or double tertian intermitting fever; in which caſe, the Peruvian bark, or, which is more convenient, its extract, is to be given at proper diſtances of time, till the paroxyſms ceaſe to return. Nor is there any reaſon to fear, that this medicine will hinder the maturation of the puſtules: on the contrary, as this new effervеſcence of the blood, and commotion of the humours, may eaſily prove an obſtacle to the ſuppuration; by checking theſe, all things proceed in their uſual courſe. But firſt, the body is to be opened by a clyſter. Now the caſe is much the ſame here with reſpect to this febriſuge, as in mortifications, in which it is known to be of ſignal ſervice [d]: and it was from a reflection, that mortifications are always accompanied with a fever, that I have propoſed the ſame medicine in the bloody Small-Pox, interſperſed with black ſpots, or in other words, with ſmall gangrenes [e].

Here it may not be improper to lay down one general rule, which is, that whatever acute diſeaſe comes upon the Small-Pox, requires to be treated with its own peculiar medicines, and generally bears them very well.

By this time I hope I have thrown ſufficient light on the moſt material circumſtances of this part of my ſubject. But before I cloſe it, it ſeems well worthy of notice, that this diſeaſe is generally very mild, when it is contracted ſoon after ſome conſiderable evacuation, whether natural or artificial. Thus a woman in child-bed has generally a kindly ſort of the Small-Pox; if ſhe has recovered ſomewhat of ſtrength, by the time ſhe is ſeized with the diſtemper; and therefore reaps benefit from her late ſufferings. The ſame thing may be ſaid of ſuch as are newly recovered from ſome acute diſeaſe. And I have formerly ſeen many patients in the hoſpital, who, after ſalivation for the venereal diſeaſe, caught the Small-Pox, while they were yet vaſtly emaciated; and all of them went through it with great ſafety; a manifeſt proof, that any evacuation, by withdrawing fuel from the fire, agrees particularly well with this diſeaſe. Laſtly, to all that I have hitherto ſaid, this one remark more is proper to be added. Though this be naturally a dreadful diſeaſe, yet it is ſometimes found to produce very good conſequences. For in conſtitutions, where the blood is vitiated, either from an original taint, or by the manner of living; and glandular tumours are occaſoned by the viſcidity of the lymph; the Small-Pox, by purifying the juices, contributes to a better ſtate of health for the future.

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[d] Vid. Medical Eſſays, Edinb. vol. v. part I. artic. 10.
[e] Chap. iii.

CHAP. V.

Of the inoculation of the Small-Pox.

THE cuſtom of inoculating, or transferring the Small-Pox from an infected perſon to one that is ſound, has prevailed among us for ſome years. This matter has drawn our phyſicians into parties; ſome approving, and others diſapproving this new practice. I ſhall therefore freely interpoſe my opinion in the caſe.

Our nature is ſo formed, that although we are always inclined to avoid whatſoever may be hurtful; yet, when any evil is to be undergone, which can only be ſuffered once, this we are impatient to go through, even with a certain boldneſs: with this view, that the remainder of life may be paſſed without the uneaſineſs which ariſes from the continual apprehenſion of its coming upon us.

It having therefore been found by experience, that no body was ſeized with the Small-Pox a ſecond time, and that ſcarce one in a thouſand eſcaped having it once; men began to conſult how the diſeaſe might be communicated; it manifeſtly appearing to be contagious, and it was obvious to conjecture, that the ſeeds of that contagion lay hidden in the puſtules.

But I have often wondered, how ſuch a notion could come into the heads of people almoſt quite ignorant of what relates to phyſick. For, as far as I have been able to find out by inquiry, this was the invention of the Circaſſians, the women of which country are ſaid to excel in beauty; upon which account, it is very common, eſpecially among the poorer ſort, to ſell young girls for ſlaves to be carried away into the neighbouring parts. When therefore it was obſerved, that they, who were ſeized with this diſtemper, were in leſs danger both of their beauty and their life, the younger they were; they contrived this way of infecting the body, that ſo the merchandize might bring the greater profit. Neither did the thing require the aſſiſtance of a phyſician or ſurgeon. It was ſufficient to make a ſmall wound in the ſkin, in any part of the body, and put into it a very little of the matter taken out of the ripe puſtules; and this even the women had learned to practiſe [f]: in like manner as our artiſts now, making a very ſlight inciſion in each arm, and putting upon it a ſmall thread of lint or cotton, imbibed with the corruption, very rarely fruſtrate the hopes of their deſirous patients.

In proceſs of time, not many years ago, this art began to be uſed in Conſtantinople, and Smyrna; not by the Turks, who, imagining all things in life to come to paſs by unavoidable fate, think it impious to oppoſe and reſiſt it; but among the Grecians, Armenians, and the people of other countries living there, who gave the knowledge of it to our countrymen [g].

But that I may omit no thing relating to this affair; a learned author [h] has given an account, that the practice of ſowing this diſeaſe, as they call it, has been known to the Chineſe above theſe hundred years; and that they do it in another manner, which is this. They take the ſkins of ſome of the dried puſtules, which are fallen from the body, and put them into a porcelain bottle, ſtopping the mouth of it very cloſe with wax. When they have a mind to infect any one, they make up three or four of theſe ſkins, putting between them one grain of muſk into a tent with cotton, which they put up the noſtrils.

It was indeed not difficult for ſuch ingenious people, when they ſaw thoſe who were converſant with the ſick, contract the ſame infection, to gueſs that the air, tainted with the foul breath of the diſeaſed perſon did, when drawn in, corrupt one, who was ſound; and therefore, they might rationally argue, that the ſame contagious matter might be taken in at the noſtrils. Nor were they miſtaken in this point.

It is however certain, (whatſoever the author of this narration, more ſkilled in theological than in medical learning, may ſay to the contrary) that this Chineſe way of implanting the diſtemper is attended with much more danger than the Grecian one. For the morbid particles inſpired violently offend the brain, by reaſon of its nearneſs to the nerves, which perform the office of ſmelling; and we have in another place proved, that contagion is propagated, not by the blood, but by the nervous liquor [i].

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[f] See Philoſophical Tranſactions, N° 339, and 347.

[g] See Maitland's Account of inoculating the Small-Pox, London, 1722. Et Diſſertatio medica de Byzantina variolarum inciſione, Auctore Le Duc. Lugd. Bat. 1722.

[h] Vid. Lettres edifiantes & curieuſes des Miſſionaires, Recueil xx. page 304.

[i] Introduction to the mechanical account of Poiſons.

I myſelf have had an opportunity of making an experiment to this purpoſe. For, when in the year 1721, by order of his ſacred majeſty, both for the ſake of his own family, and of his ſubjects, a trial was to be made upon ſeven condemned malefactors, whether or not the Small-Pox could ſafely be communicated by inoculation; I eaſily obtained leave to make the Chineſe experiment in one of them. There was among thoſe, who were choſen out to undergo the operation, a young girl of eighteen years of age; I put into her noſtrils a tent, wetted with matter, taken out of ripe puſtules. The event anſwered; for ſhe, in like manner with the others, who were infected by inciſions made in the ſkin, fell ſick, and recovered; but ſuffered much more than they did, being, immediately after the poiſon was received into the noſe, miſerably tormented with ſharp pains in her head, and a fever, which never left her till the eruption of the puſtules.

Since that time, this practice has been followed, without much fear, and indeed (as it uſually happens in new experiments) ſometimes with a degree of raſhneſs; as promiſing a milder kind of Small-Pox, than when taken in the natural way. For, by the accounts collected by thoſe, who have inquired into the affair, it is plain, that ſcarce one in a hundred dies by the inoculated Small-Pox; whereas many more in proportion are deſtroyed by the ordinary diſeaſe [k].

A remarkable inſtance of this difference, and with what ſecurity this tranſplanting the diſtemper may be made, is given in the following relation, communicated to me by a gentleman of great credit. He was a merchant at St. Chriſtopher's, in the Weſt-Indies, and in the making of ſugar, (which is the trade of that place) employed a great number of ſlaves. In one year, when the Small-Pox raged with more than ordinary violence in the neighbouring iſlands, with his own hands, he inoculated three hundred of them, from five to thirty years of age, with ſuch ſucceſs, that not one of them died, though moſt of them were negroes. And whereas all the Americans ſuffer this diſtemper in a moſt terrible manner; yet experience ſhews, that it is much more dangerous, when it attacks the natives of Africa.

Things being thus, it may be proper to conſider, whether any reaſons can be alledged to the contrary. And, in the firſt place, there are ſome, who inſiſt upon it, that the eruptions produced by inoculation are not the genuine Small-Pox, and conſequently, that they cannot ſecure any one from having the diſeaſe hereafter. Moreover, they take pains to bring teſtimonies of patients, who, after having undergone the artificial diſtemper, have nevertheleſs been afterwards ſeized with the true one.

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[k] See Dr. Jurin's Letter to Dr. Coteſworth, containing a compariſon between the mortality of the natural Small-Pox, and that by inoculation. And his account of the ſucceſs of inoculation in the years 1724, 25, and 26.

Now, I own, I cannot underſtand how contagion, that is the very ſeed of the diſeaſe, ſhould produce, not its own proper diſtemper, but another of a quite different kind. Neither certainly does it matter, by which way the infection is received, provided it brings forth manifeſt marks of the diſeaſe. And as to thoſe, who, after having been inoculated with ſucceſs, are notwithſtanding this, ſaid to have ſuffered the Small-Pox; I muſt proteſt, that, after the moſt diligent inquiry, I have not been able to find out one convincing proof of this kind. I very well know, that a ſtory is ſpread abroad, particularly by a late author, of a boy, upon whom, about three years after he had contracted the diſeaſe by inoculation, it broke out again. But I am well aſſured, that this narration is of doubtful credit; and that there were ſome of the family, who affirmed, that no Small-Pox appeared upon the inoculation; that the parents (as we eaſily believe what we wiſh) deceived themſelves, and that the by-ſtanders did not care to take away from them this pleaſing miſtake.

But to ſpeak plainly, if ſuch a thing happened once, why do we not ſee it come to paſs oftener? Or what can a ſingle example, ſuppoſing it to be true and certain, avail, when innumerable experiments have produced nothing like it? However, ſome men are infected with an incurable itch of writing, and take great pleaſure in contradicting others, to whom they bear envy. Let us therefore give them leave to applaud themſelves, and enjoy their own vain-glory.

But they will ſtill go on to terrify us, by ſaying, that there is danger leſt, together with the Small-Pox, ſome other infectious diſeaſe, inherent in the blood and humours of the ſick perſon, ſhould be tranſmitted into the ſound body; all contagion being very ſubtile, and wonderfully active. And it is indeed not improbable, that ſome other diſtemper, beſides thoſe which are cutaneous, may, by ſuch a way as this, get admittance into the ſkin; and ſuch perhaps are ſcrophulous ſwellings, and the venereal diſeaſe. Yet I can hardly believe, that it ever happens, that the ſeed of one diſtemper ſhould bring along with it mixed, the procreative matter of another, of a nature quite different from it. However it be, it would be madneſs in a phyſician, without any choice, to take the morbid matter for this purpoſe, out of ſick bodies, without diſtinction. The moſt proper ſubjects are infants or children, ſound in all other reſpects, as far as can be judged, and born of healthy parents. Beſides, it is, in my opinion, more material, into what kind of a body the venom be infuſed, than out of what it be taken. And this I the rather mention, becauſe I have more than once kown raſh and unwary ſurgeons to implant the diſeaſe into bodies weak, and of an ill habit, with a fatal event. Laſtly, it is of very great conſequence to take care not to throw a new infection into one already infected: for I have obſerved this to prove mortal; nature being oppreſſed and ſinking under a double diſeaſe, when perhaps ſhe might have got the better of either of them ſingle.

I have often conſidered for what reaſons it is, that the inoculated is ſafer than the natural Small-Pox; and the following ſeem to be the chief, Firſt, the venom is communicated to a young, healthy, and, for the age, ſtrong body. In the next place, the violence of the fever, which follows, is prevented, if there be occaſion, by bleeding, and gentle purging. And laſtly, through the whole time, that the contagious matter is exerting its malignity upon the humours (which is generally eight or nine days) quietneſs, moderation in diet, and every thing elſe is ſtrictly obſerved: whereas, many incur the natural diſtemper on a ſudden, when the blood is heated with wine and exerciſe; by which means, all the ſymptoms muſt neceſſarily prove more ſevere and dangerous. Some have alſo been of opinion, that the diſcharge out of the wound made to introduce the purulent matter, and likewiſe from the ſmall pimples which break out round it, may contribute ſomething to the ſafety of the patient. But the ſmall quantity which runs out this way cannot, I think, avail much. Two bliſters laid, one to an arm, the other to a leg, will certainly do much more; eſpecially if they be kept running throughout the whole courſe of the diſeaſe. And I make no queſtion, but this practice would be of very great ſervice.

It is proper to mention, that this artificial diſeaſe is uſually ſo mild, that it ſcarce requires any help from medicines. But where it happens otherwiſe, as it ſometimes does, the ſame will be neceſſary, which have been directed in the ſeveral kinds of the natural Small-Pox.

To conclude; it ought not to be omitted, that boils, and ſwellings, under the ears, and in the armpits, ariſe more frequently after the diſtemper procured by art, than after that which comes of its own accord; for this reaſon as I ſuppoſe, that the venomous matter is puſhed forward with leſs force, which diſadvantage nature makes amends for this way.

Therefore, all poſſible means are to be uſed to ripen ſuch tumors, of whatever kind they are: if this cannot be done, they muſt be opened by inciſion; and when all the matter is drawn out, the body muſt be purged by proper medicines, which are to be oftener repeated in this, than in the natural diſeaſe.

CHAP. VI.

Of the Meaſles.

THE Meaſles have a great affinity with the ſmall-pox; being originally bred in the ſame country, propagated in the ſame manner, by infection, into diſtant parts of the world, and never ſeizing any perſon more than once.

The hiſtory of this diſeaſe, as it generally appears among us, Dr. Sydenham has deſcribed with his uſual accuracy, calling it a fever, which in its nature and method of cure agrees very much with the ſmall-pox; that is, accompanied with a great inflammation, and in which puſtules of a particular kind are thrown out upon the ſkin.

Now this inflammation does not only affect the ſurface of the body, but the inner parts alſo, and particularly the lungs: hence follows a cough, with a difficulty of breathing. And although the diſtemper in its nature be leſs dangerous than the ſmall-pox, and continues a ſhorter time; for it uſually is ended in ſix or ſeven days, or, at the fartheſt, in eight, very thin, and light ſcales, like fine flower, falling off from the ſkin at that time; yet it ſeizes with more violent heat, and greater anxiety than the other does. Therefore Rhazes obſerved, that the inflammation of the whole body, the inquietude, and anxiety of mind, are much more terrible in the Meaſles, than in the ſmall-pox [1].

I have therefore often wondered, why that ſagacious and experienced phyſician, whom I have ſo often mentioned with praiſe, did not preſcribe bleeding in the very beginning of the diſeaſe; but neglected this material part of the cure ſo far, that he only ordered it at the end, when a hot regimen, and too warm medicines, had brought upon the patient a cough and ſhortneſs of breath. Eſpecially ſince he himſelf takes notice, that the looſeneſs, which often follows this fever, and which, he ſays, proceeds from hot vapours from the inflamed blood falling upon the bowels, is only to be cured by blood-letting [m]. But the great man deſerves pardon upon this account, that in thoſe times, phyſicians never attempted to take away blood in thoſe fevers, which were attended with any eruptions, particularly in children, who are the moſt liable to this kind of illneſs. Their reaſon was, leſt that emptying of veſſels ſhould hinder the coming out of what was to be diſcharged by the ſkin. But daily experience ſhews, that this fear is vain, and that the event is quite contrary to what they imagined.

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[1] See his book, at the end of this. Chap. i.

To come therefore to the cure; as this peſtilential diſeaſe is of kin to the ſmall-pox, it requires a management not very different from the ſame, which we have recommended in that diſtemper. Blood muſt be taken away in the beginning, according to the age and ſtrength of the patient. It is beſt, if poſſible, to do this before the eruption of the puſtules; but if they are already come out, it muſt however be taken away. For the greateſt danger is an inflammation of the lungs, which cannot be prevented too ſoon. Therefore in the height of the fever alſo, although bleeding was not neglected in the beginning, yet it is ſometimes neceſſary to repeat it. And in the laſt place, at the end of the diſeaſe, when the ſkin is now growing dry, and the ſcales falling off, it will be a great error not to open a vein again; that by this means, a flux of humours upon the breaſt and inteſtines, and the ſymptoms of a hectick fever and conſumption, may be happily prevented.

It is really a thing to be grieved at, that phyſicians, in ſo great an inflammation of the whole ſurface of the body, ſhould not always have directed this leſſening the quantity, and thereby checking the heat of the blood. And I moſt of all wonder, that Dr. Morton, who took notice of the neceſſity of this practice, when the diſeaſe was at the higheſt, ſhould abſolutely forbid it in its firſt appearance. But this phyſician's judgment was perverted by a vain, and not rightly underſtood, opinion of a malignity and venom infecting the animal ſpirits; which had ſo poſſeſſed his mind, that he thought of nothing more, than of throwing into the body hot medicines, called cordials, as auxiliary forces againſt the ſuppoſed enemy [n]. A bad example, and at the ſame time a convincing proof, how neceſſary it is, that a man ſhould be inſtructed in the principles of mechanick philoſophy, before he applies himſelf to the art of phyſick.

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[m] De morbillis, cap. v. p. 207. edit. 1685.

The diet ought to be the ſame as is preſcribed in the ſmall-pox; taking particular care that the body be kept lax, rather than bound up, through the whole courſe of the diſtemper.

As to remedies; to thoſe cooling ones, which are directed in the other diſeaſe, muſt be added ſuch as abate the cough, and help expectoration; particularly oily linctus and the pectoral infuſion, of which, with the addition of a little nitre, the patient may drink frequently.

Dr. Sydenham gave diacodion, even on the firſt days of the illneſs; but I think he was not cautious enough in this point; for all medicines of this kind thicken the humours, ſtreighten the breath, and retard the eruption of the puſtules. Therefore, during the increaſe of the diſtemper, they are to be uſed very ſparingly; but at the latter end they are of great ſervice: inaſmuch as there is then a neceſſity to quiet the cough, which, from the ſharp defluxion upon the lungs, threatens a hectick fever and conſumption. But in the mean time, gentle purges are to be given at due intervals. Milk, eſpecially that of aſſes, muſt be drank. Change of air is alſo neceſſary. And laſtly, exerciſe, ſuitable to the ſtrength of the patient, is to be daily enjoyed.

I am afraid, leſt I ſhould ſeem vainly to court applauſe by the following narration; yet it is ſo much to the purpoſe, and ſo happily confirms what I have ſaid, that I muſt beg leave to relate it. About forty years ago, the Meaſles raged with ſo great violence in this city, that they proved more fatal than even the ſmall-pox. At that time, a phyſician of great eminence came to me, deſiring that I would inform him what method I followed in this diſeaſe. I aſked him, whether or not he uſed to take away blood? He anſwering no, becauſe Sydenham very ſeldom did it; I adviſed him to open a vein in the beginning of the diſtemper, or if he was called in later, as ſoon however as he poſſibly could: for ſaid I, this diſeaſe always brings with it a peripneumony, which he very well knew ever required bleeding. Not long after, he met me again, returning me hearty thanks for my counſel, aſſuring me, that he had not loſt one patient, whom he had treated in this manner. Since that time, this practice grew ſo common, that it is now followed even by our apothecaries.

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[n] De febribus inflammatoriis, cap. iv.

In the laſt place, it is proper to take notice, that, as was obſerved concerning the ſmall-pox [o], the diſeaſe is more or leſs rife, according as the ſeaſon of the year and ſtate of the air conſpire with the infection; ſo the like happens in the Meaſles. And Dr. Morton relates, that in the year 1672, this diſtemper was ſo terrible, that in London there died of it three hundred every week [p].

But I have at laſt finiſhed this little work: which though it may perhaps, to contentious and malevolent perſons give matter for calumny and finding fault; yet will, I hope, prove beneficial to mankind, eſpecially to our own countrymen. This is all I deſire; for the conſciouſneſs of having done right is beyond all praiſe, carrying with it its own reward; and this he always enjoys, who conſults the publick good, and by his actions ſhews, that he thinks he is

Not for himſelf, but for the whole world born [q].

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[o] Chap. ii.

[p] Append. ad Exer. de morbis acutis, pag. 427.

[q] Non ſibi, ſed toti genitum ſe credere mundo.
Lucan. l. ii. v. 383.

RHAZES's
TREATISE
ON THE
SMALL-POX
AND
MEASLES.

PREFACE.

In the name of God, merciful and gracious.

ABU-BEKER MOHAMMED, the ſon of Zacharias, ſaith thus:

On a certain night, at a meeting in the houſe of a nobleman, of great goodneſs and virtue, and very fond of the explanation of uſeful ſciences, that they might be made plain and intelligible for the publick benefit; the converſation having turned on the Small-Pox, I then ſpoke what came into my mind on that ſubject. Which when that great man (whom may God long preſerve for the good of mankind) had heard; he deſired, that I would write a diſcourſe on that diſeaſe with ſufficient aptneſs, ſolidity, and clearneſs: becauſe there had never yet been publiſhed, either by the ancients or moderns, a ſatisfactory account of it.

I therefore compoſed this treatiſe, hoping to receive my reward from the almighty and glorious God, as the effect of his good will.

Now this is the ſum of its contents, and the heads of the chapters.

CHAP. I.

Of the cauſes of the Small-Pox; and how it comes to paſs, that no mortal, except by chance here and there one, eſcapes free from this diſeaſe.

CHAP. II.

What bodies are moſt diſpoſed to the Small-Pox: alſo of the ſeaſons of the year, in which they moſt frequently happen.

CHAP. III.

Of the prognoſtick ſigns of the eruption of the Small-Pox and Meaſles.

CHAP. IV.

Of the regimen, or cure of the Small-Pox, in general.

CHAP. V.

Of preſervation from the Small-Pox before the ſigns of them appear; and the way to hinder the multiplying of them after the ſigns have appeared.

CHAP. VI.

Of thoſe things which haſten the eruption of the Small-Pox: alſo how nature is to be aſſiſted therein.

CHAP. VII.

Of taking care of the eyes, throat, ears, and joints, as ſoon as the the ſigns of the Small-Pox have appeared.

CHAP. VIII.

Of ripening the puſtules.

CHAP. IX.

Of drying the puſtules.

CHAP. X.

Of taking away the dry ſcabs of the Small-Pox, and the eſchars from the eyes, and the reſt of the body.

CHAP. XI.

Of deſtroying the marks of the Small-Pox.

CHAP. XII.

Of the food and diet in the Small-Pox.

CHAP XIII.

Of managing the diſcharges of the belly, in the Small-Pox.

CHAP. XIV.

Of the curable and incurable Small-Pox and Meaſles.

RHAZES's

RHAZES'S TREATISE ON THE SMALL-POX AND MEASLES.

CHAP. I.

Of the cauſes of the Small-Pox; and how it comes to paſs, that no mortal, except by chance here and there one, eſcapes from this diſeaſe: Alſo a brief account of what Galen has mentioned concerning it.

AS to thoſe phyſicians, who affirm, that the moſt excellent Galen has made no mention of the Small-Pox, and therefore that he did not know this diſtemper; ſurely they have either never read his works at all, or only very curſorily; nay, moſt of them do not know, whether what he plainly ſays of it, is to be underſtood of that diſeaſe. For Galen, in a certain treatiſe, ſays, this * * does good this and that way, and alſo againſt the Small-Pox. And in the beginning of the fourteenth book of Pulſes, that the blood is putrefied in an exraordinary degree, and that the inflammation runs ſo high, that it burns the skin; ſo that the Small-Pox, and peſtilent carbuncle, are bred in it, and quite conſume it.

And in the ninth treatiſe of the book Of the uſe of the parts, he obſerves, that the ſuperfluous parts of aliments, which are not turned into blood, and remain in the members, putrefy, and in time increaſing do ferment; whence, at laſt, are generated the peſtilential carbuncle, the Small-Pox, and confluent inflammations.

Laſtly, in the fourth part of his Commentary upon the Timæus of Plato, he ſays, that the ancients gave the name φλεγμονὴ to every thing, which produces redneſs, as the carbuncle, and Small-Pox; and that theſe diſeaſes are bred in thoſe, in whom bile abounds.

But as for thoſe, who alledge, that he has propoſed no remedy or cure, nor explained the nature of this diſtemper, they indeed ſay what is true: for he mentions no more than what we have cited. But God knows, whether he might not have done it in ſome other books, which have not yet appeared in Arabic.

As for my own part, I have with great diligence inquired of thoſe, who underſtand both the Syriac and Greek language, and deſired them to inform me concerning this matter: but not one of them could tell me more than what I have ſet down. But this indeed I very much wonder at, and why he paſſed over this diſtemper in ſilence; eſpecially ſince it was frequent in his time, and therefore there was great reaſon for his preſcribing remedies againſt it, as he was ſo diligent in finding out the cauſes and cures of diſeaſes.

The moderns have, it is true, propoſed ſome medicines for the cure of the Small-Pox, but not diſtinctly and clearly enough; neither has any one of them explained the cauſe of it, and why, except here and there one, no body eſcapes it; nor ſhewed the methods of cure in a right order. Upon which account, I hope that the good man, who encouraged me to undertake this work, will have his recompence; and that my reward will be doubled, when I ſhall have deſcribed whatever is neceſſary to the cure of this diſeaſe in due method, aſſigning to every thing its proper place; by the help of God.

Wherefore let us begin to recite the efficient cauſe of this diſtemper; and why it happens, that ſcarcely any one mortal eſcapes it. And then we will purſue ſeparately, in the ſubſequent chapters, the other things, which relate to it; and, with God's aſſiſtance, ſhall ſay on each head whatever is neceſſary for its cure.

I ſay then [a], that the body of man, from the time of his nativity, till he arrives at old age, continually tends to dryneſs; and that therefore the blood of infants and children, and, in proportion, the blood of young men, abounds much more with humidity, than the blood of old men, and is alſo hotter. And this indeed Galen teaches us, in his Commentaries upon the Aphoriſms, where he ſays: The heat of children is indeed greater in quantity, than the heat of young men; but the heat of young men is more violent in quality. This alſo is evident from the force of their natural actions, as the digeſtion of their food, and accretion in children.

Therefore, the blood of children may be compared to new wine, in which the fermentation leading to ripeneſs is not yet begun: And the blood of young men to the ſame, fermenting and emitting ſteams, till it is quiet and ripe. And, laſtly, the blood of old men is like to wine, whoſe ſtrength is gone, ſo that it becomes vapid, and begins to grow ſour.

Now, the ſmall-Pox ariſes, when the blood putrefies and ferments, and the fermenting particles are thrown out of it; the blood of children, like to new wine, being changed to that of young men, which is as wine perfectly ripened. And this fermentation and ebullition is the diſeaſe.

And this is the reaſon why children, eſpecially males, rarely eſcape being ſeized with it. For, without doubt, as the wine naturally ferments till it comes to perfection; ſo the blood undergoes the ſame alteration, in paſſing from its firſt to its ſecond ſtate. And there ſeldom happens a temperament in an infant or child, in which ſuch a change can be made in a ſmall time, and without manifeſt ſigns of it: As may be judged from their diet, which in infants is milk; and in children, not milky, but their food is ſtronger, in proportion, than that of other ages, and more compounded. To which it may be added, that in theſe there is, after food, a greater motion of the humours. For theſe reaſons, very few children go into life without this diſtemper. Beſides this, great alterations are made here, by different temperaments, manners of life, and habits; as alſo, by the conſtitution of the ambient air, and ſtate of the blood, both as to quantity and quality: For in ſome this flows quicker, in others ſlower; in ſome it abounds, in others it is deficient; in ſome it is very bad, in others in a better condition.

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[a] Here begins the tranſlation of the anonymous Greek interpreter.

As to young men, whereas the change in their blood is already made, its maturation finiſhed, and the particles of moiſture, which ſhould cauſe putrefaction, are now exhaled; hence it follows, that this diſeaſe cannot be generated in them, at leaſt but very ſeldom, that is, in ſuch, whoſe blood ſtill abounds with too much humidity, or is very corrupt, with a violent inflammation; or who, perhaps, when they were children, had been attacked with the chicken-pox, when their blood had not yet paſſed from the firſt ſtate to the ſecond; or, laſtly, who have a moderate heat, that is, without much moiſture; and when they had the chicken-pox, were of a dry temperament, and lean.

In an advanced age, the diſtemper will ſcarcely appear, unleſs perhaps in putrid, malignant, and peſtilential conſtitutions of the air, in which this diſeaſe chiefly rages. For ſuch an air diſpoſes bodies very much to heat and moiſture; and an inflamed air promotes eruptions, by blowing up the ſpirit in the ventricles of the heart, and communicating to it the like diſpoſition, which by the force of the heart, is ſent into the blood, which is in the arteries; and brings it into the ſame ſtate of corruption.

Thus we have ſufficiently, though ſuccinctly, treated of the cauſes of the Small-Pox. We ſhall now proceed to ſhew, what bodies are moſt diſpoſed to this diſeaſe and the Meaſles.

CHAP. II.

Of bodies diſpoſed to the Small-Pox.

BODIES inclined to this diſeaſe are generally ſuch, as are moiſt, pale, and fleſhy; the well-coloured alſo, eſpecially, if they are ruddy and tending to brown, are diſpoſed to it, if they are loaded with fleſh. So are likewiſe thoſe, who are frequently liable to acute and continual fevers, to running of the eyes, red pimples, and boils, proceeding from the eating of ſweet things; as dates, honey, figs, grapes, and all thoſe ſweets, in which there is a groſs humour; particularly, thick gruels, food made of unground wheat, with honey and water, or a great quantity of wine and milk.

Lean, bilious, hot, and dry bodies are more inclinable to the Meaſles, than to the Small-Pox. But if they happen to be taken with the Small-Pox, the puſtules are either few, diſtinct,

ſtinct, and favourable; or, on the contrary, very bad, irregular, deceitful, dry, with putrefaction, and no maturation.

Laſtly, thin and dry bodies, of a cold temperament, are neither ſubject to the Small-Pox, nor to the Meaſles. And if they happen to catch the Small-Pox, they have but few, in a moderate way, and without danger, with a very ſlight fever; becauſe ſuch conſtitutions extinguiſh the diſeaſe in its very beginning.

The ſeaſons of the year, in which the Small-Pox are moſt frequent, are various: they rage moſt at the latter end of the autumn, and the beginning of the ſpring; and when in the ſummer there are great and frequent rains, with continual ſouth winds; and laſtly, when the winter is warm, and the winds ſoutherly.

When the ſummer is exceſſively hot and dry, and ſucceded by a hot autumn, in which rains come on very late; then the Meaſles quickly ſeize thoſe, who are diſpoſed to them, that is, thoſe who are lean, hot, and of bilious conſtitutions.

But all theſe things admit of great differences, by reaſon of the diverſity of countries and places, and occult diſpoſitions in the air, which bring on thoſe diſtempers, and render bodies ſubject to them. And therefore at ſuch times, great diligence is to be uſed in the preſervation from them; as we ſhall ſhew in the ſequel.

CHAP. III.

Of the prognoſtick ſigns of the eruption of the Small-Pox and Meaſles.

THE eruption of the Small-pox is preceded by a continual fever, a pain in the back, itching in the noſe, and terrors in ſleep. Theſe are the proper ſigns of the approaching Small-Pox, eſpecially the pain in the back, with a fever; and alſo a pricking, which the patient feels all over his body; together with a fulneſs and redneſs of the face, which at times goes and comes: A redneſs of the eyes, a heavineſs of the whole body; frequent yawnings, a pain in the throat and breaſt, with a difficulty in breathing, and ſtreightneſs in the gullet; then a dryneſs of the mouth, thick ſpittle, a hoarſeneſs of the voice; head-ach, anxiety of mind, inquietude; ſick qualms and heavineſs of heart, oppreſs more in the

Meaſles, than in the Small-Pox, unleſs the Small-Pox be of a bad ſort; for the Meaſles are from a very bilious blood. And, on the other hand, the pain in the back, the heat and inflammation of the whole body, eſpecially in the throat, with a ſhining redneſs, are more proper to the Small-Pox than to the Meaſles.

Wherefore, upon the appearance of theſe ſigns, or ſome of the worſt of them, you may be aſſured, that one or the other of theſe diſeaſes is nigh at hand.

As to the ſafer kind of the Small-Pox; in theſe, the quantity of blood is greater than its bad quality: And hence ariſes the pain of the back; the greater blood-veſſels, which are ſituated near the vertebræ of the back, being diſtended with too great a quantity of blood.

CHAP. IV.

Of the regimen, or cure of the Small-Pox in general.

THE firſt article ſhall be of the preſervation to be uſed, before the ſigns of the Small-Pox appear; and after they have appeared, how the diſeaſe may be leſſened.

The ſecond, concerning the eruption.

The third, the care to be taken of the eyes, ears, noſe, throat, and joints.

The fourth, of the ripening of the puſtules.

The fifth, of their drying.

The ſixth, how the ſcales and cruſts are to be cleared from the eyes, and the reſt of the body.

The ſeventh, of deſtroying the marks.

The eighth, of the diet in the Small-Pox.

The ninth, of regulating the diſcharge by the inteſtines.

The tenth, of curable and incurable Small-Pox and Meaſles.

Of each of theſe I ſhall, God willing, briefly, but ſufficiently, diſcourſe.

CHAP. V.

Of preſervation from, and leſſening the diſeaſe.

BLOOD ought to be taken away from children and young men, if they have never had the Small-Pox, or have only had what is called the chicken-pox (eſpecially at ſuch ſeaſons as we have above deſcribed) before they are ſeized with a fever, and the ſigns of the diſeaſe appear. A vein may be opened in thoſe, who are fourteen years old; to thoſe who are younger, cupping-glaſſes muſt be applied, and their lodgings ſhould be kept cool.

Let their diet be yellow lentils, tarts made of unripe grapes, minced fleſh meat, dreſſed with vinegar and honey, or with the acid ſyrup; to which raiſins, a few figs, chiches are ſometimes added: Alſo kid-broth, veal-jellies, and boiled woodcocks and hens. But theſe muſt be mixed with the juice of unripe grapes.

Their drink ſhould be water cooled with ſnow, or clear ſpring water cold; with which their chamber may alſo be ſprinkled.

Let them frequently eat acid pomegranates, and the inſpiſſated juices of acid and aſtringent fruits, as pomegranates, currants [b], and the like.

Where the conſtitution is hot, and there is a great inflammation; barley-water, with a fourth part of acid pomegranate juice, may be drank in the morning. But if the heat be leſs, a ptyſan of barley, with ſugar, is proper; and vinegar, lentils, pomegranates, and the juice of unripe grapes, may be added to the food; for all theſe thicken and cool the blood, and make the diſtemper more mild.

This regimen is of great ſervice in all times of peſtilence; for it diminiſhes the malignity of peſtilential ulcers and boils; and prevents quinſeys, pleuriſies, and all diſtempers ariſing from bile and blood.

The patient may go into cold water, and ſwim in it about noon. He muſt abſtain from new milk, wine, dates, honey, and, in general, from ſweet things, and meats, made by a mixture of fleſh, onions, oil, butter, and cheeſe; from mutton, beef, ſhell-fiſh, high-ſeaſoned things, and hot ſeeds.

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[b] The Arabic word is Ribas, which alſo ſignifies a ſort of lapathum acetoſum, or ſorrel, of which the red and acid juice boiled to two thirds, is called Rob de Ribes. See Golii Lexic.

Inſtead of theſe, in times of contagion, he may eat young birds; and if the temperament be hot and moiſt, liable to putrefaction, or hot and dry, and apt to be inflamed; he muſt eat as follows; that is, in the hot and dry conſtitution, cooling and moiſt garden-herbs, purſlain, mallows, beet, gourds, cucumbers, ſorrel, and ſmall pompions.

As to ſweet melons, they are forbidden; and if any one by chance eats of them, he muſt preſently drink a ſpoonful of the juice of ſome of the acid fruits. He may be allowed ſoft fiſh, and butter-milk.

To the food of thoſe, who are corpulent, fleſhy, and of a ruddy complexion, ſuch cooling and drying things, as we have mentioned, may be added. They ſhould all forbear labour, fatigue, bathing, venery, walking or riding in the ſun and duſt, drinking of ſtagnating waters, blaſted fruits, or mouldy herbs; and alſo figs and grapes: Becauſe theſe drive the humours to the skin, and, filling the blood with flatulent ſpirits, diſpoſe it more to fermentation and ebullition. Their body muſt be opened, if there be occaſion, with the juice of prunes and ſugar, or with whey and ſugar. If the air be putrid and peſtilential, their face may be continually ſprinkled with the water of ſanders and camphire; which, if it pleaſes God, will have a good effect.

As to ſucking infants; if they are fat and ruddy, and above five months old, let them be cupped; and let the nurſe, as far as poſſible, be managed in the manner we have mentioned.

I come now to thoſe medicines, which thicken and cool the blood, and check its ebullition and putrefaction.

All acid things are proper for this purpoſe, eſpecially the water called al-râib, that is, the ſour, bitter water, which ſwims upon butter-milk expoſed to the ſun; and the acid juice of citrons.

The ſame intention is very well anſwered by many things which have any aſtringency joined with their acidity, and thereby condenſe the blood. Such are, ſour grapes, ſumac, rob ribas, or the inſpiſſated juice of currants, apples, quinces, and pomegranates; jujubes, lentils, coleworts, coriander, lettuce, poppies, endive, night-ſhade, ſugar called bambu [c], the ſeeds of fleawort, and camphire.

The following compoſition is good to cool the blood, and reſtrain the heat of the liver, and efferveſcence of the bile.

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[c] The Indian name for a concreted juice, like ſugar, in an Indian reed.

Take of red roſes beaten, ten drachms; bambu-ſugar, twenty drachms; ſumac, the ſeeds of wild ſorrel, lentils peeled, berberries, the ſeeds of purſlain, ſeeds of white lettuce, of each five drachms; red ſanders, two drachms and a half; camphire, one drachm.

Let theſe be mixed, and give three drachms of this powder to the patient every morning in his drink, together with an ounce of the juice of wild ſorrel, or of ribas, pomegranate, or unripe grapes, and the like.

The medicine al-ſacangjabin, that is, oxymel with ſugar, is likewiſe good, which is thus prepared.

Take one part of red, ſharp vinegar, depurated; two parts of roſe-water; mix, and infuſe in the cold mixture, one ounce of red roſes; half an ounce of balauſtines; two ounces of pomegranate-peel, for the ſpace of three days. Then ſtrain the liquor, adding to it, according to the quantity of the vinegar, twice or thrice as much of the ſugar tabarzad, that is, white ſugar-candy. Boil it ſufficiently, and uſe it.

It will alſo be of uſe to take of roſes and bambu-ſugar, of each ten drachms; white ſanders, three drachms; camphire, one drachm; and moiſten them with the mucilage of the ſeeds of fleawort: then make the maſs into pills, or troches. Of theſe, at proper times, three drachms may be given in the patient's drink, together with one ounce of the aforeſaid al-ſacangjabin.

Beſides the above, the following ſyrup is excellent, and wonderfully exceeds in virtue all others, which I have ſeen tried; though perhaps the ſyrup of pearls, which the Indians deſcribe, and of which they boaſt more than they can have experienced, may be more powerful. For they ſay, that if any one drinks of that ſyrup, though nine puſtules have already appeared, there will not come out a tenth.

Now the compoſition of mine is this.

Take of red vinegar depurated, old and ſharp, three pounds; of the juice of acid pomegranates, the acid juice of citrons, the juice of unripe grapes, of ribas, of the Syrian mulberries, the expreſſion of Syrian ſumac, and berberries, of each one pound; the juices of lettuce and tarragon, of each a quarter of a pound; of the decoction of red jujubes, and the infuſion of lentils, each a pound and half. Mix all together, and add three pounds of ſugar; boil the whole, and put to it ſome of the ſyrup already made, hot, working it with a peſtil, till it is diſſolved: then mix it with the whole, ſtirring it continually with a ſtick of camphire wood; throw it into a mortar of ſtone, or willow-tree wood, taking out the cleareſt part all the while; having added and mixed bambu-ſugar and camphire. Uſe this before the Small-Pox appears, and alſo after the appearance, as we ſhall direct anon. It is alſo proper in all diſtempers, which ariſe from a bilious blood, in peſtilential ulcers, boils, quinſeys, and the like.

What I have ſaid may in general ſuffice concerning preſervation from the Small-Pox, before the fever, which attends their ſigns, comes on.

The laſt mentioned ſyrup repels the diſeaſe from one, who is in ſuch a condition, that it can be repelled; ſo that what comes out will be very moderate. It alſo effects, that the change of the blood from the firſt ſtate to the ſecond, ſhould not be done too haſtily, and at once, with too great ebullition, and frightful and dangerous ſymptoms; but by degrees, and in a longer time; in the way of maturation, not putrefaction, without terrible and dangerous fevers.

But when the fever, which accompanies the eruption, ariſes, this regimen is no longer to be uſed, unleſs with great caution and prudence; for a miſtake here is very dangerous, for this reaſon, that while the blood is rarefied, and nature according to the temperament of the patient, is endeavouring to expel the morbifick matter; if then the refrigeration and condenſation, which you intend, does not exceed the cool ſtate the patient was in before, it will happen, that the ebullition will break out a ſecond or third time; and thus nature will be diſturbed in her work. Neither can that ebullition be checked, without great danger; for thoſe remedies muſt be uſed for this purpoſe, which do in a manner congeal and coagulate the blood; ſuch are, opium, hemlock, a great quantity of juice of lettuce, night-ſhade, and the like. And the congelation of the blood, and extinction of natural heat, by all theſe, is not ſafe; becauſe of the exceſs, which is eaſily committed: For it will be hard, at the ſame time to repreſs the effervefcence, and preſerve the due natural heat. In one word, care muſt be taken, not to extinguiſh preternatural and natural heat together.

Now I ſhall communicate a practice, which phyſicians, either through ignorance or avarice, that they only may receive profit from it, uſually conceal; and it is this. When you obſerve, upon the ſigns of the diſeaſe, a diſtenſion of the belly, pain in the back, redneſs of the face and eyes, a violent head-ach, with a full pulſe, and alſo a ſtreightneſs of breath, a red and turbid urine, and ſuch a heat of the body, as a man feels, who has been for ſome time in a hot bath; eſpecially, if the body be fleſhy; there is then all the reaſon in the world to take away blood. Wherefore, draw away a good quantity, even till the patient faints away. It will be beſt to do it from the baſilick vein, or ſome of its branches; but if that cannot be found, from the cephalick vein. Sometimes, when the baſilick does not appear, it may be taken away from the vein in the ancle; but better from the baſilick or its branches, becauſe they draw from the greater veins in the abdomen more than the cephalick does.

If the ſymptoms do not run very high, although they are manifeſt, draw blood but ſparingly; and when they are leſs, take away very little. Then proceed in the cure with repelling medicines, as has been mentioned.

If by theſe the feveriſh heat is removed, and the pulſe and breath are come to their natural ſtate; ſtill inſiſt on the uſe of them, till the heat of the diſeaſe is perfectly abated, which will be done in a ſhort time.

In order more effectually to perform this extinction, let the patient drink water, made cold in ſnow to the higheſt degree, very plentifully and often; ſo that he may feel the coldneſs of it in his bowels. If, after this, the fever and burning return, give this water, a ſecond time, two or three pints, or more, in the ſpace of half an hour.

If ſtill the heat return, and the belly be full of water, make him vomit it up, and then give it again. And if the water finds a paſſage, either by ſweats or urine, you may be aſſured the patient is in a good way.

But if the water does not paſs, and the heat returns as it was at firſt, or even is more violent; omit giving the water ſo often, and have recourſe to the other extinguents, which have been deſcribed; and if the patient finds relief, perſiſt in the uſe of them. If, on the contrary, you perceive, that they produce an intolerable uneaſineſs and inquietude, you may certainly know, that the eruption of the Small-Pox or Meaſles is at hand. Wherefore you muſt quit this method, and haſten to aſſiſt nature, in expelling her ſuperfluities, in the manner I ſhall deliver in the following chapter.

CHAP. VI.

Of thoſe things, which haſten the eruption of the Small-Pox.

THE eruption of the Small-Pox and Meaſles is promoted by the following means The patient muſt be well wrapped up in clothes, and his body rubbed all over. He muſt be kept in a room not very cold; he ſhould drink frequently, a little at a time, of cold water; to provoke ſweat, and aſſiſt the protruſion of the humours to the external parts.

The ſick perſon muſt put on a double ſhirt, the borders of which muſt be bound. Underneath him, place two ſmall baſons of very hot water, one before, and the other behind him; ſo that the vapour may come to the whole body, except the face; by which means the ſkin will be rarefied, and diſpoſed to receive the erumpent humour. For the ſurface of the body may, in this caſe, he compared to a leech, which to cool its own heat, attracts whatſoever it can. And by this management, not only is the ſkin ſoftened, but the ſtrength of the patient is alſo preſerved: So that nothing can be more proper.

As to furnaces and baths, they are both deſtructive at this time, by ſo over-heating and weakening, that a ſwooning follows; by which nature is diverted from its work with great danger, if the fit be violent and long: For nothing is a greater indication of the approach of death, the natural heat retiring into the inner parts; after which it will be ſoon oppreſſed and extinguiſhed by the over-abounding humours. Likewiſe, when the hot vapour, which I have directed, is uſed, it muſt never be ſuffered to cool upon the body; but is preſently to be wiped and dried off, with great diligence. This method is abundantly ſufficient to forward the coming out of the diſeaſe, when nature is not languid, or the humours too thick and viſcid.

But in caſe it happens, that the outward fever is indeed mild, but anxiety and inquietude continue, and the eruption is difficult; you muſt wait till the fifth day is over, and then uſe thoſe medicines which promote the eruption. But this is to be done with great caution, and all manner of attention, in the way which I have mentioned, when ſpeaking of the rules to be obſerved in giving extinguiſhing remedies: For an error here, although it be not ſo great as the other, yet is alſo dangerous.

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And the caution conſiſts in not being too haſty in giving theſe medicines, but to inſiſt upon the former regimen, as long as there is any proſpect of ſucceſs without them; and as long as you are not yet certain, that the fever is too remiſs in the inward parts, as well as it is in the outward. This you will eaſily know, by the pulſe and reſpiration not being too quick, full, or irregular; and if, in feeling the breaſt, you do not find it hot in the higheſt degree. For though the fever be doubly or trebly increaſed, it will not therefore be mortal; as you may judge by comparing this with other fevers, which you have obſerved in perſons of the ſame temperament, and in the ſame degree of heat with your patient, who nevertheleſs have recovered.

Theſe extinguiſhing remedies are alſo to be applied, when, as ſoon as the puſtules appear in the ſkin, the patient feels himſelf to be pretty well, and his pulſe and breath are eaſy. But if, on the other hand, the eruption goes on ſlowly and with difficulty, they muſt be abſolutely forborne: For to uſe them, is to ſtrive againſt nature, and check the protruſion. And when any anxiety follows upon the uſe of extinguents, eſpecially a palpitation of the heart, be ſure that you have committed a great error. You muſt therefore immediately take all poſſible pains in ſoftening the ſkin, in the manner I have taught; and give to drink frequently warm water, either alone, or in which fennel and ſmallage-ſeeds have been firſt boiled, and the like ſimples, which conduce to the eruption; according as the heat of the patient, and his ſtomach will bear them; regard alſo being had to the ſlowneſs of the pimples in coming out.

This is the deſcription of an eaſy, gentle medicine, which, without too much heat, promotes the eruption.

Take yellow figs to the number of thirty; raiſins, the ſtones being taken out, twenty drachms; pour upon them three pints of water, and let them boil till they are diſſolved. Give to the patient of this liquor half a pint, at three ſeveral times. Then cover him up well in clothes, and foment the body, as is above directed.

The following is yet more powerful.

Take of the aforeſaid decoction four ounces; of the decoction of fennel and ſmallage-ſeeds, two ounces; let the patient drink it, as has been directed.

One ſtill more efficacious is this.

Boil fennel-ſeeds and ſmallage-ſeeds, of each ten drachms, in an earthen veſſel, till the water is red; ſtrain it, and give three ounces at a time.

Laſtly, this compoſition is very good and uſeful, at ſeveral times.

Take of red roſes four drachms; of lentils decorticated nine drachms; yellow figs ten; of gum tragacanth three drachms; of white raiſins ſtoned, ten drachms; lack, cleared from its ſticks, and waſhed, three drachms; fennel and ſmallage-ſeeds, of each five drachms. Boil all theſe in three pints of water, to one pint: ſtrain the liquor, and give half a pint of it, with a ſixth part of a drachm of ſaffron, twice or thrice, as there may be occaſion.

We ſhall now ſpeak of thoſe parts of the body, of which care is to be taken.

CHAP. VII.

Of taking care of the throat, eyes, &c. as ſoon as the puſtules have appeared.

As ſoon as ever the ſigns of the Small-Pox appear, particular care muſt be taken of the eyes, the throat, the noſe, and ears, and alſo of the limbs, in the way I am going to deſcribe Nay, ſometimes it will be neceſſary to extend our care even to the ſoles of the feet, and the palms of the hands: For oftentimes violent pains ariſe in theſe parts, the hardneſs of the ſkin hindering the eruption.

Upon the firſt appearance of the ſigns, drop roſe-water into the eyes now and then; alſo waſh the face with cold water often in a day, and ſprinkle the eyes with the ſame. For if the diſeaſe be mild, this method will prevent the puſtules breaking out in them. This indeed is to be done, for greater caution; for in the mild ſort, it ſeldom happens, that any puſtules break out on the eyes. But in a bad ſort, when you ſee a large eruption in the beginning, with an itching of the eye-lids, and redneſs of the white of the eyes, ſome places of which are redder than others; you may be aſſured that the Small-Pox will break out there, unleſs great help be given: Therefore immediately drop roſe-water, in which ſumack has been infuſed, into the eyes, ſeveral times in the day.

It will be ſtill more effectual to apply a collyrium, made of galls in roſe-water, by dropping it into the eyes; or to inſtil into the eyes what is ſqueezed from the pulp and ſkins of the ſour pomegranate, firſt chewed. Then waſh the eye-lids with a collyrium, made of the water of quinces, the juice of un-

unripe grapes, boxthorn, aloe, and acacia: Of each of theſe let there be one part, and a tenth part of ſaffron; and drop ſome of it into the eyes.

But if you obſerve a turgeſcence in the humours, and the eruption to be very copious, ſo that puſtules will certainly fall upon the eyes, becauſe redneſs appears here and there in their white part, from the exceſs of the inflammation; and alſo find, that what you have applied does not remove that redneſs, but only leſſen it for a time; after which it returns more violently than before, or at leaſt continues as it was when you began this treatment; you muſt not proceed any longer in this method, but, inſtead of theſe things, drop into the eyes ſome of the acid liquor expreſſed from mouldy bread, with the Nabathæan bitter, in which there is no vinegar, or other acid.

As to the puſtules, which break out in the tunica cornea of the eye, theſe darken the ſight. and are to be cured, according to the degree of their thickneſs, by ſuch diſſolving remedies, as I am going to deſcribe: Which indeed are ſometimes effectual, and ſometimes not; the ſucceſs depending upon the matter being more or leſs thick, and upon the greater or leſs firmneſs and dryneſs of the body.

But if large puſtules ſhew themſelves in the tunica uvea, uſe the collyrium of roſe-water ſeveral times in the day and night, with great diligence; or elſe that before-mentioned, leaving out the ſaffron; inſtead of which, put a ſmall quantity of blood-ſtone to keep down the ſwelling.

Theſe things are what ought to be known concerning the eyes. Care is next to be taken of the throat and mouth, leſt any eruption there ſhould grieve the patient, and hinder his breathing; for it often happens, that in a bad kind of the diſeaſe, terrible ſuffocations are brought on, which leave no hopes of a recovery.

Therefore, on the firſt appearance of the ſigns of the Small-Pox, let the mouth be gargled with the water of acid pomegranates, or of ſumack, or with the juice of mulberries, or with ſome of thoſe things, which we have recommended, (Chap. V.) under the head of extinguent remedies; or laſtly, if nothing elſe be ready at hand, with pure cold water; and that very often, to prevent a great erruption into the throat and mouth, and ſtrengthen thoſe parts, or at leaſt hinder what is already broken out there from cauſing a ſuffocation. Be quick therefore, and diligent in applying this cure, eſpecially, if from a hoarſeneſs of voice, ſtreightneſs in breathing, and a pain in the throat, a neceſſity of it ſhall appear.

Moreover, if the ſtrength will bear it, take away blood from the cephalick vein; and that even after the whole eruption is over. And if the patient find any thing in his mouth, or throat, which hurts him; and yet there is not too great a heat there, neither are his bowels too looſe, let him lick by degrees of freſh butter mixed with white ſugar-candy. But if there be any heat and inflammation there, give a linctus of this kind.

Take of ſweet almonds decorticated one part; of the ſeeds of gourd two parts; of white ſugar-candy three parts; the mucilages of the ſeeds of fleawort, and of laurel-berries; a linctus of gum-arabick, almonds peeled, and the ſeeds of the plane-tree, and wheat-flower: mix all theſe with a mucilage of quince-ſeeds.

In the next place, let us take care of the limbs: for upon theſe a number of very bad puſtules often ariſe, which corrupt them to ſuch a degree, that the muſcles, tendons, nerves, and the bones themſelves lie bare. Aſſiſt therefore immediately, if you obſerve the ſigns of the diſeaſe to be violent and exceſſive; that is, bathe the limbs with ſanders, quince-water, Armenian bole, roſes, camphire, vinegar, and roſe-water: But take care not to overdo it. If the puſtules are very large, open them with an inciſion-knife, to let out the matter: and delay not this operation; for the caſe is dangerous.

Now let us come to the cure of the noſe and ears, leſt they ſhould be over-filled with the pimples: For this will greatly afflict the patient; and when they break out in the internal part of the ear, there is danger of their coming preſently into the noſe. Take therefore a cotton cloth, upon which camphire has been broken; by the help of this, put into the ear fragrant wine-vinegar, to which has been added quince-water, or the juice of boxthorn. Do this in the morning, and repeat it twice or thrice a day.

Laſtly, if a great pain ariſes in the ſoles of the feet, prepare inſtantly to anoint them with warm oil, and foment them with warm water and cotton. If this does not aſſwage the pain nor facilitate the eruption, beat up decorticated ſeſam with milk; anoint with it, and bind it on with cloths, and leave it upon the part all night. In the morning, put the foot into warm water; and repeat the ſame again. Or bruiſe dates with butter, and apply them; or, laſtly, anoint with the lees of the ſeſamine-oil. For, theſe, and the like things, ſoften and relax the ſkin; and by this means diminiſh the pain, and promote the eruption.

CHAP. VIII.

Of ripening the Small-Pox.

WHEN, after the eruption is compleated, you obſerve the puſtules tend too ſlowly to maturity, and yet that the patient is otherwiſe in a very good way, as to his reſpiration and pulſe, and pretty free from inquietude and anxiety; then it behoves you, to aſſiſt the maturation of the puſtules.

But if, together with a backwardneſs of ripening after the eruption, you perceive the puſtules to become hard and warty, and the patient not at all better; or if his illneſs increaſes; then you are to know that the Small-Pox is mortal. Wherefore, have no thoughts of ripening the puſtules; for they are of that kind which cannot be ripened.

Now, the maturation of the Small-Pox, if curable, is to be effected by fomenting the body with the ſteam of a hot decoction in water of camomile, violets, melilot, marſhmallows, and bran, either ſeparate, or collected together in two baſons; as we have directed above, where we treated of facilitating the eruption.

And if then the patient ſeems to find relief and refreſhment by the fomentation, you are to abſtain from thoſe fumigations, which are commonly employed for drying up the puſtules; until they ripen of themſelves, and are capable of bearing thoſe things, which contribute towards drying them up: of which we are now going to treat.

CHAP. IX.

Of drying the puſtules.

IF the puſtules are large and very numerous, they muſt be dried; or the fluid contained in them muſt be ſoaked up with fine clean cotton, in which there is nothing that may hurt the patient. And then let fumigations be made with the leaves of dried roſes, or with the leaves of the ſtorax-tree, or with ſanders, or with the leaves of the iris, or the tamariſk: and indeed roſes are more convenient in ſummer, but tamariſks in winter.

The Small-Pox ſometimes abounds with too much moiſture. When that happens, order the patient to lie on pounded roſes, or on rice-meal, or on millet-meal, with which a mattraſs of a thin texture is ſtuffed.

If the body be full of puſtules, lay moiſt leaves of the iris under the patient; and beſprinkle him with an aromatick powder made of aloe, frankincenſe, ſarcocol, and dragon's blood.

But if the puſtules break ſpontaneouſly, or from the quantity of the fluid contained in them, and are ſlow in drying, treat them in this manner.

Take of ſeſamine-oil one ounce; of Andarene [d] ſalt pounded fine, and of alum, each two drachms. With this liniment anoint the body, carefully avoiding thoſe places which are ulcerated or excoriated, or even too near an approach to them; becauſe the medicine would raiſe a violent inflammation. Let the liniment lie on the parts for the ſpace of an hour; then waſh it off with a decoction in water of emblick myrobalans, white tamariſk-berries, myrtle-leaves, and pomegranate peels.

If the puſtules are dried by theſe means, it is well; if not, take the whiteſt ſort of bole (not the red bole) add to it of Andarene ſalt, and of dry bread crumbled fine, each a tenth part. Make a liniment, with which rub the ſkin; let it lie on for an hour or two, and then waſh it off.

Now we are to treat of taking off the dried ſcales, and cruſts, or eſcars.

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[d] Andar is a village, a mile diſtant from Aleppo, where a very white foſſil ſalt is found. See Maundrell's journey.

CHAP. X.

Of taking away the dry ſcabs and eſcars.

WHEN the Small-Pox is withered, and the dry ſcales and eſcars ſtill remain on the ſkin, examine them well; and to thoſe that are ſmall, and thoroughly dried up, apply warm ſeſamine oil every now and then, till they are ſoftened, and fall off: but thoſe of the face are to be managed with oil of piſtaches. For the larger ſort, which reſemble eſcars, if you find any moiſture remaining in them, cut them off carefully, without any application of oil. And if the places, from whence you have removed the eſcars, contain but little moiſture, it is to be dried up with ſoft cotton, as I have already ſaid: but if they contain much, they are to be dried gradually; beſprinkling them with the red aromatick powder, compoſed of aloe, frankincenſe, ſarcocol, and dragon's blood, eſpecially if they begin to leſſen, and ſink in; and with alum and Andarene ſalt, if they are even with the reſt of the ſurface of the body, and do not ſink in: then wait till a new eſcar or ſcab is formed on them. If there be any return of moiſture, repeat the ſame dreſſings. And in fine, when the moiſture is entirely exhauſted, then anoint the parts with oil, until the cruſts are ſoftened, and all fallen off.

Next follows a diſcourſe on deſtroying the marks of the Small-Pox.

CHAP. XI.

Of deſtroying the marks of the Small-Pox.

THE marks of the Small-Pox are of two ſorts: for they are either in the eye, or on the reſt of the body. Now with reſpect to the eye, the part on which the Small-Pox broke out, has an opaque whiteneſs in it, as we have already obſerved. If this happens in the eyes of children, or young perſons of a moiſt conſtitution of body, and tender ſkin, it will be the more eaſily deterged.

Now the medicines, which deterge the eye, and take off the whiteneſs, are theſe: borax, or nitre made into cakes, Andarene ſalt, ſal-ammoniack, glaſs, the ſcoriæ of glaſs, coral,

ral, tutty, lapis hæmatites, verdigreaſe; baſtard ſponge, the ſea crab, the dungs or excrements of ſparrows, ſwallows, ſtarlings, mice, bats, and of the Arabian or Lybian lizard; muſk, the ſediment of urine; the acorus, ebony, cornel-water, Arabian ſugar, dregs of vinegar burnt, myrrh, ſandaracha or juniper gum, commonly called varniſh, gums of the olive and bitter almond-trees, and the milky juice of wild lettuce. It will be beſt to uſe theſe, when the patient is juſt come out of the bath, or after holding his head over the ſteam of hot water. But mild medicines alone, nay the mildeſt of theſe, are to be employed, eſpecially in ſoft and moiſt bodies.

The deſcription of a mild medicine, which removes the white ſpecks from the eye.

Let the eye be ſprinkled with ſarcocol, and white ſugar-candy.

Another, more efficacious.

Let the eye be ſprinkled with baſtard ſponge, ſarcocol, and ſugar.

Another ſtill more powerful.

Take of verdigreaſe ten drachms; myrrh, ſagapenum, ſal-ammoniack, ſarcocol, of each two drachms and a half; baſtard ſponge, ſcoriæ of glaſs, and borax, or nitre in cakes, of each three drachms. Then take of ſweet cane ten drachms, and the ſame quantity of colnel-water. Boil theſe in ten times the weight of water, till the decoction becomes thick: then diſſolve the gums in it, and mix all well together into an ophthalmick collyrium. Afterwards, as occaſion ſhall require, to this mixture add ebony in an oil-bottle. Cleanſe the part affected gently and often with a needle or ſtyle; taking care to apply the collyrium frequently, both before and after the operation. And laſtly, ſprinkle it with the powder of the milder ſort of the medicines. But be ſure to look carefully into the eye every day. For if it be pained, or look angry, omit this treatment for ſome days, and then repeat it; for this method of cure is very powerful and efficacious.

As to the medicines, which take off the marks of the Small-Pox from the face of the reſt of the body, they are theſe: white litharge, dried reed-roots, rotten bones powdered, baſtard ſponge, coral, ſarcocol, almonds, birthwort, the ben nut, radiſh-ſeed, pumpion-ſeed, rocket-ſeed, the flower of beans, rice, lupins, and kidney-beans. On theſe pour the aqua amurcæ, and barley-water.

The deſcription of a liniment, which effaces the marks of the Small-Pox.

Take of the flower of chiches and beans, each three drachms; of pumpion-ſeed five drachms; of white litharge two drachms; of dried reed-roots three drachms. Pound all together in barley-water: then apply it to the parts ſeveral times ſucceſſively, after the patient has received the ſteam of hot water, or after coming out of the bath. Then again waſh him in a bath, made of pumpion-rinds, dried violets, bran, and pounded chiches, boiled in water: rub him well, and apply the liniment a ſecond time.

The deſcription of another liniment of greater efficacy.

Take of bean-meal five drachms; bitter almonds, ſweet coſtus, rocket-ſeed and radiſh-ſeed, of each two drachms and a half: apply it, as we have already directed.

Another liniment more efficacious ſtill.

Take of bitter almonds peeled five drachms; radiſh-ſeed, rocket-ſeed, roots of coſtus, and long birthwort, of each two drachms and a half; of borax, or nitre made into cakes, three drachms; of pepper one drachm and a half: uſe them as we have already directed. Afterwards, waſh the parts with radiſh-water, or with thoſe things, which we have ordered. And thoſe are the medicines, which efface the marks and ſcars of the Small-Pox.

But in order to efface the pock-holes, and render them even with the reſt of the ſurface of the body, do thus: let the body be anointed with butter, and well tinged with the herb cyperis, or with its powder: let the patient uſe the bath frequently, and be rubbed down after it.

Now we are to direct what ought to be given to a patient in the Small-Pox by way of aliment, and to treat of the medicines which have relation to it.

CHAP. XII.

Of the diet of patients in the Small-Pox.

TO a patient in the Small-Pox, it is neceſſary to give barley-water, prepared in the ſame manner, and with the ſame art, as that, which is uſually given to perſons in acute and hot diſeaſes. If the fever be moderate, and the body ſomewhat coſtive, it muſt be ſweetened with white ſugar-candy; but if the heat of the fever be intenſe, and the body looſe, pour to it half a meaſure of the juice of acid pomegranates,

granates, pounded with their ſeeds: but the pulps and inward thin tunicles are to be avoided; for they are laxative.

If the patient be reſtleſs, and cannot ſleep, add to the barley-water ſome proportion of poppy. But if the body be very looſe, add to the barley-water one part of dry ſeeds of acid pomegranates, and one part of poppy.

But, if it be requiſite to bind the body, inſtead of barley-water, take meal of peeled barley, and the meal of pomegranate-ſeeds; boil theſe in the ſame manner as barley-water is made, and let the ſick drink of this, as he would drink of barley water; either alone, or with bambu-ſugar and gum-arabick mixed with it, if a looſeneſs ſhould make it neceſſary; or with the medicines which I ſhall deſcribe anon. For barley-water, mixed with pomegranate-juice, is very ſerviceable in the Small-Pox, and more eſpecially in the Meaſles. But the waters of the gourd, of the Indian pompion, and of the cucumber; the mucilage of fleawort-ſeeds, and the like, of whatever kind, which make a mild phlegm, and eaſy to be ſpit up; theſe waters, I ſay, are more uſeful in the Meaſles, than in the Small-Pox; unleſs it be in thoſe ſorts of the Small-Pox, which are accompanied with a malignity and heat, together with a violent fever and want of ſleep.

But in thoſe caſes of the Small-Pox, wherein the fever and inflammation are not ſo vehement, thoſe things above-mentioned, and others of the like kind, have no other effect, but to render them ſlower, and to protract the whole courſe of the diſeaſe: wherefore it will be your buſineſs to have recourſe to this or that ſort of medicines, or to abſtain from them, as occaſion ſhall require. For when the Small-Pox happens to be in the higheſt degree of heat and putrefaction, with the addition of moiſture; then thoſe things, which have a cooling, drying, and condenſing quality, are more proper; ſuch as juice of pomegranates, verjuice, and others of the ſame nature.

But when the diſeaſe is the Meaſles, which ariſe from a vehement ebullition of the bile blended with the blood; thoſe things, which have the two-fold virtue of cooling and humecting, are the moſt proper in their cure; inaſmuch as the corrupted blood is tempered and corrected by their means. For the blood of a perſon, in the Meaſles, is like ſtagnating water, which putrefies by long ſtanding; whereby its natural texture is deſtroyed, and, by the action of the ſun, it contracts a vicious acrimony. But if theſe waters are mixed with rain, or any other running ſweet water, they ſoon recover their former wholeſomeneſs.

Moreover, in the Small-Pox barley-gruel is beneficial, if it be taken with ſugar and pomegranate-juice, or with a proper quantity of julap; giving due attention to the patient's looſe or coſtive ſtate, as likewiſe to his greater or leſſer degree of heat: except that barley-water is lighter to take, eaſier to ſwallow, and more ſuitable to the throat and breaſt. Wherefore, act according to theſe directions, after you have been apprized, that barley-water is more proper for perſons in the Meaſles, than in the Small-Pox; unleſs the Small-Pox happen to be of a bad ſort, in the manner we have mentioned.

As to the reſt, vetches well cleanſed are good in the Small-Pox, if a food be prepared of them with the juice of acid pomegranates, or with vinegar: the meal of lentiles is uſeful alſo, if the meal be wrought up with cold water.

Know likewiſe, that cold water is more ſerviceable to a patient in the Meaſles, than in the Small-Pox; as being ſafer, and of a more certain effect.

Now, when you ſee the Small-Pox attended with great inflammation, and a ſtoppage in the pulſe and reſpiration; then give extinguiſhing medicines, proportioned to the ſymptoms: if they are leſs urgent, employ few; if very urgent, employ many.

But never allow the eating of young birds, until the pulſe and breath have returned to their natural ſtate; nor till the puſtules are thoroughly withered, and the ſcabs fallen off.

Let us now turn the diſcourſe upon looſening the belly, and reſtringing the ſame in the Small-Pox.

CHAP. XIII.

Of managing the diſcharges of the belly, in the Small-Pox.

THE belly is generally looſe in the Small-Pox and Meaſles towards their decline, but eſpecially in the Meaſles. For which reaſon, every thing muſt be avoided which opens the body, after the Small-Pox and Meaſles are conducted to the end; even though the body be bound. But if it be lax, inſtantly abſtain carefully from thoſe things which give ſtools: although it be neceſſary in the beginning of theſe two diſeaſes, and before they are on the decline, to give a laxative. For it is ſometimes requiſite to open the body in the Small-Pox, either upon account of the exceſs of heat, and pain in the head; or in order to eaſe nature of her load, and leſſen the morbifick matter, when you have reaſon to think it over-abundant. And it will be really ſo, when you find the body, both before and after bleeding, neither weakened nor waſted; but on the contrary, bloated and full, with a paleneſs, or a little redneſs, and a fluctuating pulſe. For ſometimes, in ſuch a ſtate, bleeding will not be neceſſary, and it will be ſufficient to evacuate the ſuperfluous humidity: and that eſpecially, when the aforeſaid ſigns evidently appear; and beſides, if through the ſluggiſhneſs of the fever, the body be dejected, and entirely void of a red colour. In this ſtate, a very proper medicine is a decoction of yellow myrobalans, if it be drank with white hard ſugar, and the juice of an acid pomegranate, (two or three, if there be occaſion) bruiſed with the pulp and internal tunicles. For it is the quality of theſe two medicines to purge the body of the ſuperfluous humours, together with part of the bile, without raiſing any heat; eſpecially the pomegranate juice; and to leave nothing behind them in the inteſtines. And this is the beſt medicine, which can be given in this caſe.

But in the Meaſles give the juice of Damaſcene plumbs, and the plumbs themſelves, freſh gathered, either alone, or bruiſed with julap, adding ſugar to them. But avoid the medicine called tarangioben [e]: for it is as prejudicial in the Meaſles, as honey is in the Small-Pox; both upon account of the exceſſive heat, which it occaſions, and of increaſing the nauſeating and uneaſineſs of the ſick. In like manner carefully avoid giving them the juice of ivy, or of the black violet to drink: becauſe they both equally heighten the diſorder in the body.

Now, whereas the firſt and moſt neceſſary remedy in the Small-Pox is, to draw blood, when it is too much in quantity, or there is no proſpect of checking its ebullition by any other means, even by extinguents; but there is a neceſſity for taking a little away, as well for relieving nature, as for abating the fulneſs of the blood-veſſels, and eaſing them of their over-great load, which muſt otherwiſe be productive of very bad conſequences; eſpecially if the blood be heated to that degree, that a violent inflammation might enſue: in the ſame manner, it behoves you, in the beginning of the Meaſles, to draw off ſome of the bile, when you perceive it over-abundant; and then to purſue what remains of it by extinguents. Now the ſign of an exceſſive redundancy of the bile is, the violence of the inflammation, and the uneaſineſs, together with the diſcharge of the ſame bile, both by vomit and ſtool, and a bitterneſs in the mouth.

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[e] A ſort of manna among the Sogdians, Medes, and Babylonians, which concretes on the leaves of certain ſhrubs, and is gathered thence.

But if the quantity of the bile is not exceſſive, and yet there is an uneaſineſs, and thirſt, and vehement heat, without any appearance of bile, either by vomit or ſtool; though its quantity, I ſay, be not exceſſive, we may however judge it to be of a bad quality, in proportion to the violence of the inflammation and uneaſineſs.

And this is what I have thought proper, that you ſhould know, concerning the management of the diſcharges of the belly, when it is looſe in the beginning of theſe two diſtempers. Now, if the belly be lax, give nothing laxative: for in this caſe, any thing that increaſes the diſcharges is not ſafe in either of the diſtempers. But while the belly continues looſe, order the patient, inſtead of barley-water, to drink barley-gruel; and if it be neceſſary, boil the barley-gruel with meal of pomegranate-ſeeds; of which let him drink, before he returns to the uſe of barley-water. And if, this notwithſtanding, the looſeneſs ſtill increaſes, mix gum-arabick and bambu-ſugar in his drink in this manner.

Take of gum-arabick two drachms; of bambu-ſugar one drachm: reduce them to the conſiſtence of a collyrium: then on four ounces of the barley-gruel pour ſome of the medicine, which I am going to deſcribe; let it ſtand for an hour, and give it to the patient to drink.

The deſcription of the medicine.

Take of red roſes ground fine, bambu-ſugar, ſorrel-ſeed, ſumack, and berberies, of each equal parts; alſo gum-arabick, ſealed earth, poppy-rinds, balauſtines, or pomegranate-flowers, of each half the quantity: let the patient drink three drachms of theſe, with one ounce of the juice of acid pomegranates.

But, if the looſeneſs ſtill continues, and has weakened the patient, give him draughts of al-râib, that is, four ſkimmed milk, with the beſt ſort of biſcuit, and a little gum-arabick.

Finally, whenever a dyſentery appears, the method of cure muſt be taken from the place, where we have treated of that ſubject.

Now it remains, that we ſpeak of thoſe, who recover, and of thoſe, who die of the Small-Pox and Meaſles.

CHAP. XIV.

Of the curable and incurable Small-Pox and Meaſles.

THE Small Pox and Meaſles are of the number of hot diſeaſes and therefore have many things in common with them. Now the chief prognoſtick ſigns in thoſe, who recover, are, a freedom of reſpiration, a thorough ſoundneſs of mind, and an appetite for food; an agility to motion; a right ſtate of the pulſe; the patient's good opinion of his diſeaſe; a convenient poſture in bed; and but little toſſing about and inquietude of body.

Hence a judgment may be formed of bad ſigns, the greateſt part of which we have related in the book, intituled, Almanſori [f].

Theſe things following particularly regard the Small-Pox and Meaſles.

When the puſtules of the Small-Pox are white, large, ſeparate, few in number, eaſy and ſpeedy in coming out, and the fever not violent or burning, nor attended with much inquietude of body or concern of mind, and are ſo qualified, that the heat, concern, and inquietude diminiſh upon their eruption, and entirely ceaſe when the eruption is completed: that ſort is curable, and threatens little or no danger. To theſe the next in goodneſs are, white large puſtules, though very numerous and coherent; if they come out eaſily, and their total eruption eaſes the patient of his uneaſineſs and exceſſive heat, as we have already mentioned.

But when their eruption is performed with difficulty, and the patient does not grow better upon their coming out, they are a bad ſort: although there is not ſo much reaſon to be afraid, if he ſhould be ill while they are coming out, as if he continues ſo after the eruption.

But there is a bad, and even a fatal ſort of white large puſtules, to wit, thoſe which run together, and ſpread ſo that many of them unite, and occupy large ſpaces of the body; or become like broad circles, and in colour reſemble fat.

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[f] There is a MS. copy of this book in the Bodleian library, Narciſſ. Marſh, Nº 376.

As to thoſe puſtules, which are white, very ſmall, coaleſcing, hard, warty, and contain no fluid; they are of a bad kind: and their badneſs is in proportion to the degree of difficulty in their ripening, and to the continuance of the ſymptoms on their eruption. But if the ſymptoms are not abated, after the eruption is finiſhed, it is a mortal ſign.

Thoſe puſtules alſo are all bad, which turn green, purple, or black. But if, beſides, a ſwooning and palpitation of the heart come on; this is the worſt ſign of all, nay a ſign of certain death.

And when the fever increaſes after the eruption of the Small-Pox, it is a bad ſign. But if the fever ceaſes at the time of the eruption, it is a good ſign. Doubled puſtules indicate a great quantity of the matter of the diſeaſe: and if they are of the curable kind, they portend recovery; but if of the mortal kind, death.

Thoſe Meaſles are the ſafeſt which have not too much redneſs: but if they turn pale, it is a bad ſign; the green and purple ſorts are both mortal. When either the Small-Pox or Meaſles ſink in ſuddenly, after they began to ſhoot out; and then the patient is ſeized with inquietude and anxiety, and a ſwooning comes on; it is a ſign of ſpeedy death; unleſs they puſh out again, after they have ſubſided.

If the puſtules appear on the firſt day of the fever, they will haſten their progreſs, and be of quicker motion: if the eruption is protracted to the third day, it will advance moderately; but if the firſt appearance paſſes the fourth day, the eruption will be completed dully and ſlowly.

When the appearance begins on the good critical days, it is a ſalutary ſign, eſpecially if the patient finds himſelf better at the end of the eruption; and ſo on the contrary. But when the puſtules begin to run into one another, and to ſpread; and at the ſame time the inquietude increaſes conſiderably, and the belly ſwells or is bloated; then death is near at hand. When the ſmaller ſort of puſtules, which contain no fluid, grow hard; and a delirium comes on at the ſame time; the patient is near his end. When it happens that the Small-Pox and Meaſles appear and diſappear alternately, and are attended with anxiety and a delirium; this is a ſign of death, of what colour ſoever the puſtules are: but it is ſeldom the caſe of white puſtules, or of thoſe which ripen quick. When towards the end of the Small-Pox, there is a great perturbation of the humours, and the patient is ſeized with a very violent pain in a leg, hand, or any other limb; or the puſtules are ſpeedily converted into a green or red colour;

and thereupon he grows weaker than he was before, and the weaknefs ſtill increaſes by the quick returns of the pain, and the limb contracts various colours; theſe are ſigns of death. But if neverthelefs the patient grows ſtronger, he will recover, and that limb will be cured.

Now if you ſcarify that limb the very moment, when the pain begins to ſeize it, you will render great ſervice to the patient, if he grows ſtronger after the inciſſion; and the limb will alſo be preſerved from mortification.

But, in this dangerous caſe, nothing cooling muſt be applied to the limb, upon any account whatſoever: but either ſcarify it, or plunge it into hot water, if you ſee that the patient can bear it.

Wherefore, as we have run over all the articles, which we propoſed to ourſelves; and have amply enough treated, both of this diſeaſe, and the method of preſervation from it; we here break off the thread of our diſcourſe.

To the beſtower of ſtrength to finiſh this work, be praiſe without end, as he is worthy of being celebrated and praiſed.

AN
HISTORICAL ACCOUNT
OF A
NEW METHOD
For extracting the
Foul AIR out of SHIPS, &c.

PREFACE.

I HAVE often ſaid, that it is not, in our country at leaſt, ſo eaſy a thing to ſerve the publick, as is commonly imagined; not meaning hereby the difficulty of finding out uſeful experiments (although even that is great enough) but the hardſhips, which attend the putting them in practice. Whence this ſhould come to paſs, it is foreign to the preſent purpoſe to inquire. They who are acquainted with the ſeveral motives, upon which men often act, among which ſelf intereſt, envy, pride, and obſtinacy, have no inconſiderable ſhare, will readily ſee the ſprings of this ſeemingly unaccountable diſpoſition of mind.

I would not have it thought, that I have had occaſion to make this ill-natured remark, from what I may myſelf pretend to have done for the benefit of the publick: but it is ſufficiently juſtified by the oppoſition, which the invention deſcribed in the following treatiſe has met with. The machine is ſo ſimple, and of ſo entenſive advantage, that as it is ſurprizing to ſee the greateſt pains taken to make it abortive at firſt, ſo it is no leſs ſtrange that it has not been ſo univerſally uſed, in the royal navy, as might have been expected from the great good, which it promiſes.

It is not my buſineſs to examine the cauſes of this neglect: which is in a very moving and handſome manner complained of in the voyage of the great lord Anſon[a]; an immortal work, which will be always read with a pleaſure, equal to the benefit to be reaped from it, with regard to our navigation and commerce to thoſe parts of the world, to which the adventures relate.

As this hero is not leſs admired for his humanity and good ſenſe, than for his conduct and courage; he has taken care that the relation of his enterpriſes ſhould be a monument of the one, as well as of the other. The accounts given of that ſtrange diſeaſe, ſo fatal to our ſeamen, the ſea-ſcurvy, are hints ſo new and uſeful in phyſick, that I have thought it not unbecoming the place, with which I am honoured in my profeſſion, to write a ſhort diſcourſe on this ſubject, and give it to the honeſt and ingenious author, to be publiſhed together with his reprinted Account of a new method for extracting the foul air out of ſhips, &c. an invention, which I may venture to ſay, does honour to our nation, and will in time be found of more publick benefit than any diſcovery in mechanicks, which has been produced theſe hundred years.

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[a] See p. 36, 37.

Having therefore had the ſatisfaction, in the beginning, to recommend this experiment to the admiralty, I now join a ſhort Diſcourſe on the Scurvy to the reprinted edition of Mr. Sutton's book, as a convincing and happy proof of the ſucceſs, which attends it. And the author has alſo added ſome other authentick accounts to the ſame purpoſe. From all theſe things duly conſidered, it is to be hoped that the evil ſpirit of oppoſition, which as is mentioned in Mr. Sutton's Account, &c. exerted itſelf even againſt the making a trial, will now be rebuked and caſt out.

To conclude, as any one verſed in mechanicks will eaſily ſee (as we formerly obſerved) that this management of the air may be applied to many other purpoſes of life; (to ſome inſtances of which I have been an eye-witneſs) ſo it will prove a great loſs to mankind, if it is not univerſally brought into practice: eſpecially, ſince by the generoſity and diſintereſtedneſs of the inventor, the whole expence may be conſidered as a trifle. Many more conſiderations might be urged; but they will readily occur to the wiſdom of thoſe, whoſe province it is to direct our naval affairs.

The foregoing Preface was written, and ready to be put to the preſs, when Mr. Sutton brought me the agreeable news, that the right honourable the lords of the admiralty had juſt then given orders, to provide all the ſhips of his majeſty's navy with this uſeful machine. Thus, laudable diſcoveries, though diſcountenanced at firſt, do at laſt break through all difficulties, and meet with ſuitable encouragement.

R. M.

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SIR,

PURSUANT to your deſire, I now ſend you an hiſtorical account of my ſcheme, together with the reaſons that firſt inclined me to employ my thoughts about it. In the year 1739, I was informed by a gentleman, that the ſailors on board the fleet at Spithead were ſo dangerouſly ill, for want of freſh air, that they were put aſhore to recover their health; and the ſhips to which they belonged, ſtunk to ſuch a degree, that they infected one another. In compaſſion to my fellow-creatures, I thought myſelf obliged to do all that was poſſible for their relief in theſe unhappy circumſtances, and from this time tried what could be done by fire. I at length found, that by ſtopping the air out of a room that had three fire-places, and making two large fires in two of them, I could bring the air to draw down the third chimney, with ſuch force as to put out a candle. I then lighted a fire in the the other chimney; which ſo rarefied the air in the room, that the incumbent air preſſed to enter in, and with a force ſufficient to raiſe a pully with half a hundred weight; and as ſoon as the room was cooled, by the coming in of the air, the door would ſhut, and then open again in three minutes.

Having proceeded thus far with good ſucceſs, I ſtopped up all the chimnies in the houſe, the garret excepted, and then lighted two large fires, which drew the air down the chimney with ſuch violence, as to put out four or five candles immediately: whereupon I concluded, that, a fire, being always kept on board a ſhip, and a pipe or cavity made to the well, one end of it being heated by fire, a change of air would follow, and that, by this means rendered ſweet and pure, and fit for reſpiration.

From this time I made it my buſineſs to conſult the officers and ſailors of the navy, who all agreed that ſuch a change of air would be of the greateſt uſe imaginable, in preſerving the lives of the men on board his majeſty's ſhips. I particularly remember, that, being at a coffee-houſe near the admiralty, I placed myſelf nigh ſome gentlemen of the navy, and enquired of them, as I had before of others, as to the uſefulneſs of the forementioned change of air, who all, to a man, acknowledged that it would be of the utmoſt ſervice; and, upon their unanimous approbation of it, I told them that I could procure ſuch a change of air; upon which one of the company went to another table, and the reſt followed him; and I heard him tell the others, that he heartily pitied me, as being really mad, and out of my ſenſes.

Upon this unexpected treatment, I reſolved to apply to ſome perſon of conſequence in the navy, of approved integrity; and well knowing that Sir Charles Wager was a gentleman of this character, and withal of the greateſt humanity, I waited upon Mr. Gaſhery, a commiſſioner of the navy, and acquainted him that I would communicate my invention to Sir Charles, by word of mouth; and that if I did not in a few minutes, convince him of its uſefulneſs I would withdraw immediately, without giving him any further trouble about it.

Mr. Gaſhery was ſo kind as to ſpeak in my behalf to Sir Charles, and thereupon I was introduced into his preſence. I deſired Sir Charles to be ſo good as to permit me to aſk him ſome queſtions relating to my affair, which he was pleaſed to permit. I aſked him, whether he had ever conſidered the principles, upon which the operations of the cupping-glaſs were founded? that, rarefaction being made in the glaſs, by means of the fire, and the glaſs preſſed to the ſkin, the air in the blood preſſes out the ſkin; and, the ſkin being cut, and a ſecond rarefaction made, the blood preſſes forward to the place where the rarefaction was made. I told him, that in like manner I propoſed to procure a change of air on board his majeſty's ſhips, by means of a fire in the cook-room, and laying proper pipes for that purpoſe.

Sir Charles, upon my diſcourſe with him about my ſcheme, not only expreſſed his approbation of it, but favoured me with the following letter to Sir Jacob Ackworth, ſurveyor of his majeſty's naval works:

SIR,

'THE bearer hereof, Mr. Sutton, has found out a method to extract the foul air out of the wells of ſhips, 'which will be of great uſe for preſerving the lives of the 'men aboard his majeſty's ſhips. He will be willing to talk 'with you, if an experiment can be made, ſo that he may 'not loſe the benefit of the invention.'

I accordingly waited on Sir Jacob, who ordered me to come to him again, five days after, at ſeven in the morning; at which time he being engaged in buſineſs, I waited at the office till evening, when he was pleaſed to expreſs himſelf to me in the following words: 'Sir, I ſuppoſe you intend to 'throw air into the wells of ſhips.' I anſwered, 'No, I 'propoſed to draw it out, by means of fire.' Upon this he aſked me, 'If I knew how far I was to draw it out?' I replied, 'Not ſix inches: for, if I could extract it never ſo 'ſmall a diſtance, the incumbent air would preſs forward of 'courſe, and, in ſo doing, cauſe a conſtant change.' He admitted this. I then told him, that I waited upon him, by Sir Charles Wager's orders, in hopes that he would appoint a time for an experiment to be made of my ſcheme: to which he replied, 'That no experiment ſhould be made, if 'he could hinder it.'

Upon this diſappointment, I petitioned the lords of the admiralty, and thereby obtained an order from them to the commiſſioners of the navy, to cauſe my experiment to be tried on board the Greenwich man of war, then lying at Woolwich. I forthwith carried their lordſhip's order to Woolwich, and, purſuant thereto, to the ſatisfaction of myſelf and all on board the Greenwich, I placed the pipes, and all things neceſſary for my experiment, except the ſoldering of two pipes: but, whilſt the ſolder was hot, and the plumber in readineſs to ſolder them, a meſſenger from the builder of his majeſty's yard came to order the workmen aſhore. I thereupon repaired to the builder, who acquainted me, that I muſt apply to the navy-board, to procure an order to have my experiment performed on board the hulk at Woolwich. I inſtantly replied, that, all the proper preparations being already

ready completed, except the ſoldering of two joints, which might be done in an hour's time, I deſired it might be tried immediately. But to this he made anſwer, that I muſt apply to the navy-board, in order that they might procure an order from the lords of the admiralty for the trying it on the hulk aforeſaid. I thereupon told him, that I inſiſted on thoſe two joints being ſoldered, that I might make my report to the lords of the admiralty, that I had faithfully executed their order; upon which, he aſſured me, they ſhould be ſoldered that very night: but when I went on board the next day, to ſee if they were ſoldered, I found them juſt as I left them the day before.

Finding myſelf thus diſappointed, I took a candle, and went down to the pipes, which were carried through deck, and laid under the beam, towards the well, about thirty feet in length from the copper; and, as ſoon as I put the candle to the ends of the pipes, they immediately extinguiſhed the flame: which fully convinced thoſe on board of the great uſefulneſs of my invention. But to my extreme ſurpriſe, I no ſooner came on ſhore, than I found, that the maſter afloat was ſent from the king's yard, to take down my pipes, and plug up the holes: upon which, perceiving the obſtructions my experiment would meet with, I determined to apply to ſome gentlemen of the faculty of phyſick, that were proper judges of the uſefulneſs of my ſcheme.

Being no ſtranger to the character of Dr. Mead, phyſician to his majeſty, diſtinguiſhed as much by his humanity as his abilities, I went directly to his houſe, ſhewed him Sir Charles's letter, and, by his appointment, the next morning came thither again, where I met the learned Martin Folkes, Eſq; preſident of the royal ſociety, whom the doctor had deſired to talk with me, together with himſelf, upon my propoſal. They both expreſſed their approbation of it, and moſt readily offered to do whatever was in their power, to encourage an invention which they judged muſt be of great ſervice to the publick. Accordingly Dr. Mead immediately waited on the lords of the admiralty, and repreſented to them, in a ſtrong manner, the advantage of ſuch a contrivance: whereupon they were pleaſed to order, that it ſhould be tried, as ſoon as poſſible, on board any of his majeſty's ſhips in the river.

Being now left at my own liberty, to chuſe a proper place for my experiment, I fixed upon the hulk at Deptford, becauſe that was immoveable, and could not like a ſhip be ſent away: and upon this I directly went to Deptford, in order to make the neceſſary preparations. I was ſoon acquainted there, that ſeveral of the workmen belonging to the King's yard were buſily employed in trying the uſefulneſs of another machine, induſtriouſly ſet on foot to ſupplant mine: but, after the ſtricteſt enquiry I have ſince been able to make, I cannot learn that they had any orders to that purpoſe from the lords of the admiralty.

This proceeding, together with the exceſſive ſhyneſs and caution of the gentlemen of the yard, led me to conclude, that my ſcheme, at laſt, would be ſet aſide, in ſpite of all the ſteps I could take to prevent it; and I was confirmed in this opinion, when I found the pipes were made of wood, between five and ſix inches wide, in ſuch an unworkmanlike manner, that to render them tight, I was forced to get ſize and paper from Deptford, to put over the joints; and that moreover many hands were employed in erecting wind-ſails, in order to ſhew, that they could thereby procure as much air as my ſcheme would afford.

At length, in September, 1741, the day appointed for the trial of the experiment came; when the lords of the admiralty, the commiſſioners of the navy, Dr. Mead, Martin Folkes, Eſq; and ſeveral other members of the royal ſociety, being preſent on board the ſaid hulk; Sir Jacob Ackworth was pleaſed to ſay, in the hearing of them all: 'I am ſorry 'that you are come to ſee the trial of ſuch a fooliſh experi'ment that I tried myſelf yeſterday, and it would not ſhake 'a candle.' To this I replied, 'It would be in good hu'mour to-day, and the end of every one of the pipes would 'blow out a candle.' And accordingly, notwihſtanding the forementioned obſtructions, and that the tarpawlings were taken away, which I had ordered to be laid over the hatches, I was as good as my word; and all the lords and gentlemen aforeſaid, upon the trial of my experiment, expreſſed their approbation of the performance.

In November following, I was ſent for by the meſſenger to the commiſſioners of the navy, and by them, purſuant to an order from the lords of the admiralty, ſent down to Portſmouth, to prepare the Norwich man of war according to my ſcheme; and, upon this occaſion, Sir Charles Wager, in the preſence of the lords of the admiralty, honoured me with the following letter to commiſſioner Hughes at Portſmouth.

Admiralty-Office, 24 Nov. 1741.

SIR,

'I Send this by Mr. Sutton, who has found out a way to 'draw bad air out of cloſe places, particularly from wells 'of ſhips, which you know are ſometimes ſo bad, as to ſtifle 'men before they can be drawn up; as happened on 'board the Lynn, while I was at Helvoet-Sluys; one man 'being killed by it, and two narrowly eſcaped. This contri-'vance is approved by much wiſer men than I am in ſuch 'things; and therefore I deſire you would let Mr. Sutton 'have all the encouragement and aſſiſtance you can give him. 'I take Mr. Alleyn, your builder, to be an ingenious man; 'if you recommend Mr. Sutton to his care, he will ſee that 'he meets with no obſtruction or diſcouragement from any 'body, that may think themſelves wiſer. There is an order 'from this board to the navy, from whom you will have it, 'to have the Norwich, who is to go to the coaſt of Guinea, 'to be fitted according to Mr. Sutton's ſcheme; which will 'be a very good experiment.' I am,

SIR,

Your humble ſervant,

CHARLES WAGER.

This letter I carried down to Portſmouth, and delivered to commiſſioner Hughes, who received me in a very friendly manner, and recommended me to Mr. Alleyn the builder; who both of them (and indeed all the perſons belonging to the yard) exerted themſelves to the utmoſt of their power, to forward my undertaking; and at length I completed it, agreeable to the plan I ſhall hereafter exhibit.

Having finiſhed this buſineſs, I waited ſome days at Portſmouth, for a report ſigned by admiral Leſtock, and ſeveral commanders of ſhips, which captain Gregory gave me reaſon to expect: but, at laſt, (though to do the Captain juſtice, I muſt own, that he treated me, whilſt at Portſmouth, in an obliging manner,) I was acquainted, that no report could be made, till the Norwich returned from its voyage; which was ſent to Guinea, and from thence to the Weſt-Indies: which conſtrained me to repent of my journey.

Soon after my return to London, I found things in the utmoſt confuſion, by the ſudden change of the miniſtry, which likewiſe occaſioned a change in the admiralty. I petitioned however the commiſſioners of the navy, humbly requeſting them to make a report of what I had done, from time to time, from the 10th of July, to the 10th of Decem. 1741, at Greenwich, Deptford, and Portſmouth, in compliance with the orders of the lords of the admiralty; in order that I might receive a ſuitable reward for my uſeful invention, and reaſonable ſatisfaction for my trouble, loſs of time, to the neglect of my other affairs, and expences in the execution of the ſame. But I received no anſwer, nor to many petitions I delivered to the lords of the admiralty themſelves; until at length, juſtly moved at the cold and unkind treatment I met with, I freely expreſſed my ſenſe of their hard uſage, in the following petition.

To the right honourable the lords of the admiralty, the petition of Samuel Sutton,

Humbly ſheweth,

THAT your lordſhip's petitioner, having invented an uſeful ſcheme, for the extracting foul air out of his majeſty's ſhips (which, in the month of September, 1741, was tried before the then lords of the admiralty, who approved the performance) lately applied to your lordſhips; but, to his extreme ſurprize, he finds, that he is not likely to receive any reward, either for the invention itſelf, or his loſs of time and expences: nor are his majeſty's ſailors and mariners likely to receive any benefit from his ſcheme; tho' it is univerſally acknowledged, that more of them have lately died in America, for want of good air, than by the Spaniards. That your lordſhip's petitioner cannot help remarking, that, though no invention ever met with more applauſe from the publick than his, never was any man (himſelf excepted) employed by the lords of the admiralty, from time to time, at his own charges, as he has been, without a proper conſideration. That your lordſhip's petitioner now deſires, that you would be pleaſed to conſider him on that account, and order him a ſuitable ſatisfaction; and as in duty bound for your lordſhips he will

Ever pray.

This petition was overlooked like the reſt, nor was there any notice taken by the lords, either of me, or my ſcheme, till captain Gregory returned to London; who, ſoon after his arrival, ſent a letter to the then lords of the admiralty, in reference to the Norwich man of war, which I fitted up at Portſmouth; and the following extract of it was left at their office for me.

Extract of a letter from captain Gregory, late commander of his majeſty's ſhip the Norwich, to Mr. Corbett, dated June 11, 1743.

'AS to the air-pipes which were put on board of me, I 'was obliged to ſtop up two of them, by reaſon the 'fire came down between decks: the other to the well was 'kept open, but the ſhip making water enough to keep her 'ſweet, I was not able to judge of their uſe, having been 'ſo healthy as to bury only two men all the time I was on 'the coaſt.'

Copy, Tho. Corbett.

I have many remarks to make upon this letter, which by no means can be juſtly called a report, ſince the other officers of the ſhip were not conſulted; particularly the ſurgeon, and the carpenter, or other under officers, the moſt competent judges; the former, of the health of the men; and the latter, of the ſweetneſs and good condition of the proviſions. As to Mr. Haddon the carpenter, who had been ſeveral voyages to Guinea before, and never knew the like; he aſſured me that the proviſions continued entirely ſound, and the men healthy, free from the ſcurvy or any other diſorder, to the admiration of the people of Barbadoes, who therefore queſtioned, whether they had been at Guinea, or no: and indeed, this matter of fact, which is the main point, is for ſubſtance acknowledged by the captain himſelf; though at the ſame time, he is pleaſed to ſay, 'that he was not able 'to judge of the uſe of my pipes.' This gentleman it ſeems loſt ſo few men that he could not diſcover the uſefulneſs of my pipes; but, had he loſt the greateſt part of his crew, I dare ſay that he would have been able to judge, that my pipes were of no ſervice at all. But, though the extract of the captain's letter carries its own confutation along with it; yet, as it was ſent to the lords of the admiralty, I thought it expedient to give an anſwer to it, in the following letter to the earl of Winchelſea.

My Lord,

‘ THOUGH I have petitioned the right honourable ‘ the lords of the admiralty ſeveral times, and even ‘ wrote to your lordſhip, in reference to my extracting foul ‘ air out of his majeſty's ſhips, and never received any anſwer, except an extract from Captain Gregory's letter; ‘ yet, in juſtice to my ſcheme, I apprehended myſelf obliged ‘ to lay before your lordſhip ſome juſt remarks on the ſaid ‘ extract, which I hope will effectually remove any inferences that may be thence drawn, to the prejudice of my ‘ uſeful invention, which is founded on the moſt evident ‘ principles, and may be put in execution, at ſo eaſy a charge ‘ as about thirty pounds, in any of his majeſty's ſhips. As ‘ to the captain, he ſays, that he was obliged to ſtop up two ‘ of my pipes, by reaſon ſome ſparks of fire came down between the decks. But this might eaſily have been prevented, by adding two pipes of tin (which they never ‘ want) three feet long, and bringing them through the ‘ chimney, by which all communication would be cut off ‘ between thoſe ſparks and it. The captain alſo declares, ‘ that he could not tell, whether the pipe to the well, becauſe ‘ of the water in it, was of uſe or not; but, which ſeems ‘ to be very unfair dealing, he intirely overlooks two other ‘ pipes. I intreat your lordſhip to be pleaſed to conſider, ‘ that the pipes draw more air than any kitchen-chimney, ‘ and what is ſufficient to ſweeten any ſhip in the navy. The ‘ captain himſelf owned to me, that not ſo much as one of ‘ his men had the ſcurvy, which cannot be ſaid of any of his ‘ majeſty's ſhips heretofore, or that out of ſuch a number, ‘ ſo few have loſt their lives, and ſo many have returned in ‘ perfect health from ſuch a voyage: and indeed, if my ‘ ſcheme was generally put in practice, this, in all likelihood would become a common caſe, nor would ſhips, ‘ that come from infected places, have any occaſion to perform quarantaine, the air being preſerved by the foreſaid ‘ pipes, in a pure and wholeſome ſtate.’ I am,

My Lord, &c.

And as the principal, and indeed only, objection, in the extract againſt my ſcheme, was the danger of fire; I wrote the following letter to Sir Jacob Ackworth, his majeſty's ſurveyor, in order to ſhew, that it was entirely groundleſs.

Honoured SIR,

‘WHEN a ſcheme is propoſed for the good of mankind in general, and the preſervation of the lives ‘of his majeſty's ſubjects in particular; it is doubtleſs highly ‘reaſonable, that, as it is a matter of great conſequence and ‘importance, a ſtrict inquiry ſhould be made, whether it be ‘practicable, and will effectually anſwer the end propoſed. ‘As to the inconveniency apprehended to attend mine, that ‘it will expoſe ſhips to the danger of fire, I intreat you to ‘be ſo good as to enquire of any bricklayers, or builders, ‘whether this apprehenſion be not entirely groundleſs. I ‘could heartily wiſh that you would be pleaſed to ſatisfy ‘yourſelf in this particular; as your declaration, on this ‘point, in my favour, would have great weight with the ‘lords of the admiralty; in order to my being by them appointed to have the directions of laying pipes on board his ‘majeſty's ſhips.’ I am, Sir, firmly relying on your goodneſs,

Your humble and obedient ſervant,

SAMUEL SUTTON.

Soon after, when the plague raged in Sicily, and timely precautions were taken to prevent its being introduced hither, I again wrote to the earl of Winchelſea, as follows.

My LORD,

‘A Proclamation being iſſued out for ſhips to perform ‘quarantaine, I humbly beg leave to acquaint your ‘lordſhip, that if my ſcheme for extracting of foul air, was ‘properly put in practice on board ſuch ſhips, it would ef‘fectually preſerve the health and lives of his majeſty's ſub‘jects. And, ſuch a fume being let down as the phyſicians ‘may judge expedient, great advantages would ariſe, without ‘any ill conſequences whatſoever: becauſe, the foul air be‘ing conſumed by the fire, the fume, by means of a pipe ‘let into the hold of the ſhip, will with eaſe be drawn down, ‘there being a want of it to ſupply what is extracted. If ‘your lordſhip will be pleaſed to conſult the phyſicians, you ‘will find that what I offer is practicable, being founded on ‘juſt and rational principles.’ I am,

My LORD,

Your humble and obedient ſervant,

SAMUEL SUTTON.

Sir Jacob Ackworth, Mr. Alleyn of Deptford, and the reſt of the ſurveyors will readily atteſt, that no damage can ariſe from the fire made uſe of in my ſcheme ; which is the only objection that has hitherto been advanced againſt it.

Having thus refuted the foreſaid objection, and I hope in a convincing manner, it was natural for me to expect, without any longer delay, a reward ſuitable to the importance and uſefulneſs of my invention ; but it was ſome time after this, before I received the following order from the lords of the admiralty.

Extra.

Received the 31 Oct. 1743.

No. 688.

Mr. TREASURER,

No. $\frac{2619.}{1743.}$ ' IN purſuance of an order from the right honourable the lords commiſſioners of the admiralty, dated 22 October, 1743, ſignifying that, whereas Mr. Samuel Sutton did, ſome time ſince, propoſe to that board an invention of his, for extracting the foul air out of ſhips by fire, and letting in freſh air, an experiment of which was ordered to be made on board his majeſty's ſhip the Norwich, bound to the coaſt of Africa ; and captain Gregory, who commanded the ſaid ſhip, having ſince his return made a report thereof, a copy of which their lordſhips ſent us therewith, whereby it appears, that it does not, in all reſpects, come up to the expectation, and that the uſe thereof is dangerous. and liable to accidents by fire : yet, as the ſaid Mr. Sutton has employed a great deal of pains and time about the ſaid invention, for the benefit of the navy, and had encouragement from their lordſhips ſo to do ; and their lordſhips being deſirous to give encouragement to perſons who ſhall turn their thoughts to any inventions that may tend to the advantage of the navy, do thereby deſire and direct us to cauſe a bill of one hundred pounds to be made out to the ſaid Samuel Sutton, as a reward for the loſs of time and expences he has been at about the ſaid invention.

'We pray you to pay unto Mr. Samuel Sutton accord-
'ingly the ſum of one hundred pounds, dated 22 Oct.
'1743.'

J. B.
31 Oct. 1743.

Jam. Compton—Ca. Account.

Rich. Haddock.

J. B. No. $\frac{2360.}{359.}$ }

This, Sir, was all the ſatisfaction I could procure from the lords of the admiralty, though I had from time to time, executed their orders with the utmoſt fidelity, and even that, not till above two years after the trial of my firſt experiment on board the hulk at Deptford: a ſatisfaction that ſcarcely defrayed my expences. But I am perſuaded from what has been already ſaid, you clearly perceive, that, as matters ſtood, if the uſefulneſs of my ſcheme had appeared in the moſt demonſtrative light, I ſhould, after all have fallen ſhort of a ſuitable reward; and indeed, this is the truth of the caſe. Dr. Hales's ventilators, which were deſigned to anſwer the ſame purpoſes as my pipes, had, by ſome means or other got ſuch an aſcendant in the eſteem and regard of ſome leading perſons in the affairs of the navy, as, in ſpite of conviction itſelf, to admit of nothing to come in competition with them; though even that darling ſcheme is now out of date and exploded. Far be it from me, to inſult and triumph over a conquered adverſary: and it is needleſs as well as cruel, to ſpend much time in confuting a ſcheme, that experience has abundantly ſhewn to be abſurd and ridiculous. However, I think it incumbent on me to obſerve, how much I was ſurprized to find no mention made by the candid author of the Deſcription of ventilators, of my invention: whereas he himſelf ſaw an experiment made before the royal ſociety with a model of it, and heard Dr. Mead's account of it read to that learned body; which account was publiſhed in the Philoſophical Tranſactions ſome time before the book of Ventilators was printed. Upon the whole, this is a peculiar advantage attending my invention, that its beneficial influences are perpetual, without the leaſt intermiſſion; whereas Dr. Hales fully evinces the inſufficiency of any attempts to make the air in ſhips wholeſome, by only a few hours ventilation.

tilation. ‘ It were to be wiſhed (ſays he, p. 41.) that there ‘ ſhould not be ſo much as one hour without ventilation, ‘ when the ports are ſhut.’ His ventilators are cumberſome machines, taking up more room than can conveniently be ſpared, and require many hands to work them: my pipes take up no room, but what may be very well ſpared, and ſtand in need of no manual labour at all. His ventilators have only a caſual and uncertain, but my pipes a certain and uninterrupted, effect. His ventilators cannot extract the air from the well at the bottom of the ſhip; but mine do this, and introduce pure and wholeſome air, in the place of impure and unwholeſome. His ventilators, he tells us, will keep a priſon ſweet; but my pipes will ſweeten even a bog-houſe, and may be conveyed miles under ground into the deepeſt mines and ſubterraneous cavities, with the ſame ſucceſs. His ventilators require much more air than my pipes, which will admit of more or leſs, as ſhall be thought expedient. And, as my ſcheme, in all theſe reſpects, ſurpaſſes his; ſo his is dead and buried, without any hope of a reſurrection, whilſt mine riſes in its reputation daily: and the report of captain Comyns, commander of the Fame privateer, which I fitted up ſome months ago, and which is returned to Liſbon with his crew in health and vigour, will give ſuch an ample and ſatisfactory atteſtation of the ſafety and uſefulneſs of my pipes, as will be ſufficient to diſpel the doubts and ſuſpicions of the moſt incredulous.

To conclude: the ſimplicity of this machine; its eaſy ſtowage without being cumberſome; its operation without any labour to the ſeamen; the ſmall expence to put it in execution, and maintain it; beſides its tendency to preſerve the health and lives of the ſeamen, to keep the ſhip dry, and the merchandize from damaging; are ſtrong reaſons why no ſhip ſhould go to ſea without it. I am,

SIR, Your's, &c.

SAMUEL SUTTON.

An account of Mr. Sutton's invention and method of changing the air in the hold, and other cloſe parts of a ſhip; communicated to the royal ſociety by Richard Mead, M. D. phyſician to his majeſty, fellow of the royal ſociety, and of the royal college of phyſicians, London.

Read Feb. 11, 1741-2.

IT is found by daily experience, that air ſhut up and confined in a cloſe place, without a ſucceſſion and freſh ſupply of it, becomes unwholeſome, and unfit for the uſe of life.

This is more ſenſibly ſo if any ſtagnating water be pent up with it.

But it grows ſtill worſe, if ſuch an air as this is made uſe of in reſpiration, that is, becomes moiſter and hotter, by paſſing and repaſſing through the lungs.

Theſe bad effects, in different degrees, according to the different manner in which air is incloſed, are obſerved in many caſes; particularly in deep wells and caverns of the earth, in priſons or cloſe houſes, where people are ſhut up with heat and naſtineſs: But moſt of all in large ſhips, in which, with the ſtench of water in the hold, many men being crouded up in cloſe quarters, all the mentioned circumſtances concur in producing greater miſchief than would follow from any of them ſingle.

The reaſon of theſe bad effects is this: It is that property of the air which is called its elaſticity or ſpringineſs, which makes it ſo uſeful to our life. When any part of it is incloſed and kept from the communication of the outward air, it expands itſelf, and, in proportion to the cloſeneſs of the place, loſes its ſpring; and if any heat or moiſture comes to it, the elaſtick force may be quite loſt and deſtroyed. And not only ſo, but if it happens to be impregnated with noxious effluvia, either from unwholeſome ſubſtances of any kind, or from the infectious breath of diſeaſed bodies: it will become quite poiſonous and deadly, in a manner ſuitable to the original cauſe.

It is propoſed at preſent to find out a remedy for this evil in ſhips only: But by making alterations according as particular places require, the ſame may be applied to any houſes or parts of them, as priſons, the ſick wards in hoſpitals, &c.

Now it is a natural conſequent of the elaſticity of the air, that when it is rarefied in any part, (which is moſt effectually done by heat) the neighbouring air will ruſh that way, till this part is brought to be of an equal denſity and elaſticity with itſelf; and this again will be followed by the air next to it: So that, if a conveyance for air be laid from the hold or well of the ſhip, and a rarefaction of the air therein be made; the foul air from this place will run or be drawn out that way, and freſh air from the adjacent parts will ſucceed in its room.

It is upon theſe principles that the following ſcheme is moſt humbly offered to the right honourable the lords of the admiralty, and commiſſioners of the navy, which it is hoped will be found effectual for clearing the bad and corrupted air from the holds, and other cloſe parts of his majeſty's ſhips; and thereby prove beneficial to the publick, by preſerving the healths of many of his majeſty's good ſubjects ſerving on board the ſame; the whole thing being indeed eaſy to be executed, and what will no way incumber, or be troubleſome, in any of the veſſels where it ſhall happen to be applied: The ſame being, in ſhort, no more than this: That whereas in every ſhip of any bulk, there is already provided a copper or boiling-place proportionable to the ſize of the veſſel; it is propoſed to clear the bad air by means of the fire already uſed under the ſaid coppers or boiling-places, for the neceſſary uſes of the ſhip.

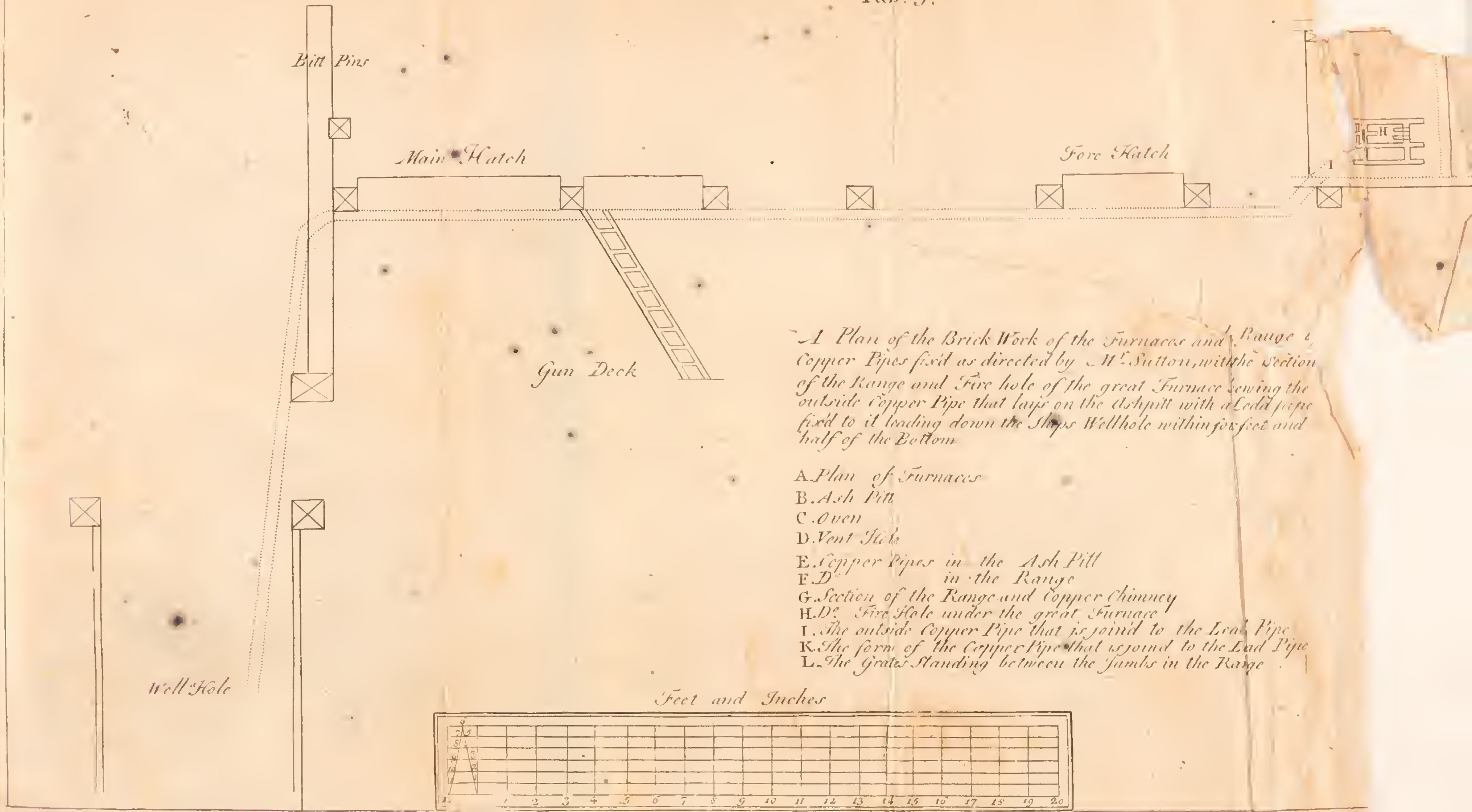
It is well known, that under every ſuch copper or boiler, there are placed two holes, ſeparated by a grate; the firſt of which is for the fire, and the other for the aſhes falling from the ſame; and that there is alſo a flue from the fire place upward, by which the ſmoke of the fire is diſcharged at ſome convenient place of the ſhip.

It is alſo well known, that the fire once lighted in theſe fire-places, is only preſerved by the conſtant draught of air through the forementioned two holes and flue; and that if the ſaid two holes are cloſely ſtopped up, the fire, though burning ever ſo briſkly before, is immediately put out.

But if after the ſhutting up the above-mentioned holes, another hole be opened, communicating with any other room or airy place, and with the fire; it is clear, the ſaid fire muſt again be raiſed and burn as before; there being a like draught of air through the ſame, as there was before the ſtopping up of the firſt holes: This caſe differing only from the former in this, that the air feeding the fire, will now be ſupplied from another place.

It is therefore propoſed, that in order to clear the holds of ſhips of the bad air therein contained, the two holes abovementioned, that is, the fire-place and aſh-place, be both cloſed

Tab. 5.



A Plan of the Brick Work of the Furnaces and Range & Copper Pipes fix'd as directed by Mr. Sutton, with the Section of the Range and Fire hole of the great Furnace ſewing the outside Copper Pipe that lays on the Ashpitt with a Leda pipe fix'd to it leading down the Ships Wellhole within ſix feet and half of the Bottom

A. *Plan of Furnaces*
B. *Ash Pitt*
C. *Oven*
D. *Vent Hole*
E. *Copper Pipes in the Ash Pitt*
F. *Do. in the Range*
G. *Section of the Range and Copper Chimney*
H. *Do. Fire Hole under the great Furnace*
I. *The outside Copper Pipe that is join'd to the Lead Pipe*
K. *The form of the Copper Pipe that is joind to the Lead Pipe*
L. *The Grates Standing between the Jumbs in the Range.*

ſed up with ſubſtantial and tight iron doors; and that a copper or leaden pipe, of ſufficient ſize, be laid from the hold into the aſh-place, for the draught of air to come in that way to feed the fire. And thus it ſeems plain from what has been already ſaid, that there will be from the hold a conſtant diſcharge of the air therein contained; and conſequently, that that air ſo diſcharged muſt be as conſtantly ſupplied by freſh air down the hatches, or ſuch other communications as are open into the hold: whereby the ſame muſt be continually freſhened, and its air rendered more wholeſome, and fit for reſpiration.

And if into this principal pipe ſo laid into the hold, other pipes are let in, communicating reſpectively either with the well or lower decks; it muſt follow, that part of the air conſumed in feeding the fire, muſt be reſpectively drawn out of all ſuch places, to which the communication ſhall be ſo made.

TO

MARTIN FOLKES, Eſq;

President of the royal ſociety.

SIR,

'According to my promiſe, I have herewith ſent you 'my obſervations upon Mr. Sutton's machine, which I 'drew up ſome time ſince, and intended to lay before the 'royal ſociety in December laſt, before I knew either that a 'model would be ſhewn by Mr. Sutton, or that Dr. Mead 'would have preſented his account thereof. I am conſcious 'of the diſadvantages my ſlender performance muſt appear 'under after the reading of one upon the ſame ſubject from 'ſo celebrated a pen as Dr. Mead's.

'Theſe remarks were the reſult of ſeveral times ſeeing the 'machine, when firſt put in execution at Deptford. I hope 'it will not take up too much of the ſociety's time to read 'my paper this evening, and am,

SIR,

Your moſt obedient humble ſervant,

W. WATSON.

Alderſgate ſtreet,
Thurſday Morning,
April 1, 1742.

Some

Some obſervations upon Mr. Sutton's invention to extract the foul and ſtinking air from the well and other parts of ſhips, with critical remarks upon the uſe of wind-ſails, by William Watſon, F. R. S.

London, Dec. 4, 1741

Read April 1, 1742.

AS nothing is more conducive to the health of the human body, than the taking a ſufficient quantity of wholeſome air into the lungs, ſo the contrary is attended with pernicious and often with deſtructive conſequences.

One of the great uſes of air in inſpiration is to cool the blood paſſing through the lungs, where nature has provided, according to the excellent Malpighius, that the blood ſhould be diſtributed through a vaſt number of exceedingly fine arteries, which occupy the thin veſicles of the lungs; and by this means the blood is expoſed to the air under a prodigiouſly large ſurface, whereby the putrefaction is prevented, which, from the alcaceſcent quality of that fluid, would otherwiſe be ſpeedily deſtructive.

Obſervations inform us, that contagious diſtempers are more frequent in hot climates than in cold; and in cloſely built cities full inhabited, than in towns: the former may, in ſome meaſure, proceed from the too great heat of the air, not fully anſwering the above-mentioned purpoſes; and the latter from too many people breathing in the ſame atmoſphere, thereby rendering it unfit for reſpiration.

It has been frequently tried, that if a gallon of air be contained in a bladder, and by means of a blow-pipe, inſpired and expired into the lungs of a man, without having any communication with the external air; in the ſpace of a minute, or little more, it becomes heated, and unfit for reſpiration; and without the addition of freſh air, the perſon making the experiment would ſpeedily be ſuffocated. The diving-bell is another inſtance of the ſame kind, wherein a conſtant ſupply of freſh air muſt be had, to keep out the water, and refreſh the people included.

Although air is abſolutely neceſſary to our exiſtence, and neceſſity conſtrains us inevitably to breathe therein, it may be made a vehicle of moſt malignant poiſons, as witneſs the famous Grotto del Cane in Italy, the poiſoning air by charcoal,

coal, and air impregnated with the fumes of fermenting vegetable liquors. Stagnant air, either alone or mixed with water, ſoon becomes very offenſive and pernicious; as in wells dug for the ſupply of water, and diſuſed for ſome time; as is the air alſo in the wells and in the holds of ſhips, which is occaſioned principally by what is uſually called the bulge-water, which if the ſhip is tight, and not frequently pumped, becomes not only very offenſive, but ſo extremely poiſonous, as frequently to ſuffocate thoſe ſeamen, who, as the pumps are ſubject to be clogged with filth, venture down to cleanſe them; and will cauſe alſo in perſons at a diſtance violent head-achs, cold ſweats, and frequent vomitings, which continue more or leſs, in proportion to the diſtance from the well of the ſhip, when the injury was received, and the degree of putrefaction in the water and air.

The air, in ſhips particularly, is very liable to be vitiated, not only from the bulge-water, but from too many people breathing in the ſame atmoſphere; eſpecially in ſhips of war, hoſpital-ſhips, and thoſe uſed in the Guinea trade for negroes; where a number of uncleanly people being ſtowed too cloſe together, heat the air, make it replete with noxious effluvia, deſtroy the particles therein adapted to cool the lungs, particularly the acid nitrous gas. This principle is abundant in cool air, and manifeſts itſelf not only from the quantity of nitrous cryſtallizations, which may be collected from caverns of the earth, eſpecially thoſe open to a northerly aſpect, but alſo from expoſing pieces of the fleſh of animals freſh cut, or their blood, whereby the colours of their ſurfaces are ſoon changed from a dark deep red to a more lively and florid one. Air robbed of this valuable property, and replete with hurtful ones, not only from the people, but from the ſtinking water in the well and lower parts of the ſhip, muſt produce the moſt putrid, if not peſtilential fevers.

Although the æquilibrium within places confined is maintained by the external air, yet unleſs, by openings properly adapted, the air is ſuffered to paſs freely enough, the external air proves as a ſtopple to the internal, and only mixes with that portion of it which is next in contact: this is evident from the common occurrence in privies, which are ſcarcely offenſive in clear weather, but are much ſo in foul or windy, from a diminution of the incumbent preſſure of the atmoſphere, when the vapours that have been pent up, expand themſelves to a conſiderable diſtance.

To prevent the above mentioned inconveniencies, and to preſerve the healths and lives of the ſeamen, that valuable part of the nation, many ſchemes have been thought of; particularly the machines of thoſe two very worthy ingenious and induſtrious members of this ſociety, the Rev. Dr: Hales, and the Rev. Dr. Deſaguliers; the firſt by an inſtrument which he calls the ſhip's lungs [a], and the latter by a machine [b], which is an improvement of the Heſſian bellows; but as theſe have been laid before the ſociety by the gentlemen themſelves, I ſhall paſs them over, and proceed to mention the contrivance commonly made uſe of, I mean the wind-ſails. They are made of the common ſail-cloth, and are uſually between twenty five and thirty feet long, according to the ſize of the ſhip, and are of the form of a cone ending obtuſely; when they are made uſe of, they are hoiſted by ropes to about two thirds or more of their height with their baſis diſtended circularly by hoops, and their apex hanging downwards in the hatchways of the ſhip; above each of theſe, one of the common ſails is ſo diſpoſed, that the greateſt part of the air, ruſhing againſt it, is directed into the wind-ſail, and conveyed, as through a funnel, into the upper parts of the body of the ſhip. Theſe muſt be hung up and taken down every time they are uſed, and the ſupply by this method is not conſtant. Though cuſtom has given a ſanction to this device, it is ſubject to many inconveniencies: 1ſt, Each ſhip, having commonly three of theſe, (one to each maſt) the ſeamen are a conſiderable time in getting their apparatus ready, and in hoiſting them up to make uſe of. 2dly, They can only be uſed in mild weather. 3dly, Near the equator, where freſh air is moſt wanted, there ſometimes happen ſuch ſtark calms, that they are uſeleſs by not having air enough to diſtend them. 4thly, The air hereby admitted paſſes only into the upper and more open parts of the ſhip, ſo that the well, &c. receive no change therefrom; and it is obſerved, that ſometimes, upon uſing them after ſome diſcontinuance, they drive offenſive air into the cabin, and more airy parts of the ſhip; like as the pouring ſome freſh into ſtinking water makes the whole ſtink, though in a leſs degree. 5thly, They are improper to be uſed in the night-time, when the people are ſleeping between decks. And laſtly, Admitting they had none of the former inconveniencies, their uſe muſt be deſtructive in hoſpital ſhips; where, though freſh air imperceptibly received, is abſolutely neceſſary to preſerve the crew as free as poſſible from the infectious breath and exhalations of the diſeaſed and wounded ſeamen; yet blaſts of wind, pouring impetuouſly into the very places where the ſick lie, muſt be attended with ſuch conſequences as are too obvious to mention.

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[a] See Dr. Hales's Treatiſe of ventilators.

[b] See Philoſ. Tranſ. Nº 437.

To remedy theſe inconveniencies, to prevent the air proving foul even in the wells and holds of ſhips, and to cauſe imperceptibly a large circulation of freſh air into every part of the ſhip at all times, Mr. Sutton has invented the following ſcheme, which is uſeful not only in theſe caſes, but, by altering ſome parts as particular places require, may be applied to houſes, the cloſe parts of priſons, wells at land, privies, hoſpitals, &c.

Nothing rarefies air ſo conſiderably as heat, which whenever it cauſes a diminution in the denſity of the air, that part next in contact will ruſh in, and be ſucceeded by a conſtant ſupply, till the air becomes of an equal degree of elaſticity. Therefore, if a tube be laid in the well, hold, or any other part of the ſhip, and the upper part of this tube be ſufficiently heated to rarefy the impending column of air, the æquilibrium will be maintained by the putrid air from the bottom of the tube, which being drawn out this way, a ſupply of freſh air from the other parts of the ſhip will ſucceed in its place, which operation, being continued, will intirely change the air in all parts of the ſhip. This principle, exactly conformable to the doctrines of pneumaticks, is the baſis of Mr. Sutton's machine, which being put in execution on board the hulk at Deptford, before the lords of the admiralty, commiſſioners of the navy, our very learned and ingenious preſident, M. Folkes, Eſq; Dr. Mead, &c. performed to their ſatisfaction, in bringing air from the bread-room, horlop and well of the ſhip at the ſame time, in ſuch quantity, that large lighted candles being put to the end of the tubes, the flame was immediately ſucked out as faſt as applied, though the end of one of the tubes was above twenty yards diſtant from the fire. The method is as follows:

To boil the proviſions of the ſhip's company, they muſt have a copper, which is bigger or leſs, in proportion to the ſize of the ſhip, and number of the crew: this copper is fixed in ſhips in the manner as on land, having under it two openings divided by an iron grate. The firſt opening, having an iron door, is for the fire; the aſhes from the grate drop through into the bottom of the other; the ſmoke paſſes through a chimney, and is diſcharged as uſual. After the fire is lighted, it is ſupported by the air from the parts next the aſh-pit; but having, contrary to the uſual cuſtom, adapted an iron door, like the former, made very tight, to prevent the ingreſs of air, the fire would ſoon be extinguiſhed, if not ſupplied by ſome other aperture: in order to which, one or more holes are made through the brick-work in the ſide of the aſh-pit; and tubes of lead or copper, fitted cloſely in the holes, and made faſt, are laid from thence into the well, and other parts of the ſhip; by which means the air next the bottom of the tubes ruſhes through them, and the foul and ſtinking air ſucceeding is tranſmitted through the fire, and paſſes off, without offending, by means of the chimney; and a ſupply of freſh air from the other parts of the ſhip continually fills the place of the former, the fire requiring a conſtant ſupport. This ſupport will be wanting, not only during the continuance of the fire, but while any warmth remains in the fire-place, copper, or brick-work, as was obſerved on board the hulk at Deptford, where the draught of air through the tube laſted above twelve hours after the fire was taken away. This being conſidered, as the dreſſing the proviſions for a number of people will take up ſome hours every day, the warmth of the brick-work and flues will continue a draught of air from one day to the next. Mr. Sutton propoſes thus to circulate the air by the ſame and no greater expence of fire than is cuſtomarily uſed for the neceſſities of the ſhip.

The operation of the machine will be equally uſeful in large as in ſmall ſhips; for the greater the number of people they have on board, the larger quantity and longer continuance of the fire will be neceſſary to dreſs the proviſions; and therefore there will be required a greater quantity of air to ſupport that fire. The ſize and number of the tubes need not be ſpecified; becauſe as the circulation of air is in proportion of the quantity of fire; the wider the tube, and greater the number of them, the leſs the velocity of the air, and vice verſa.

I ſeveral times took notice in this machine, when, for the ſake of obſervation, after the fire was well lighted, the loweſt iron door was left open, that the flame did not aſcend ſo high, or burn ſo fierce; but immediately upon ſhutting thereof; when the draught of air was only through the tubes, the flame ſoon recovered its former vigour.

There is likewiſe, eſpecially in large ſhips, not only a copper, but alſo a fire-grate like thoſe uſed in kitchens: that the heat and ſmoke of this alſo may not be uſeleſs, an iron tube may be fixed behind the grate, and inſerted quite through the brickwork, and through the deck, ſo that one end thereof will ſtand about a foot, or little more, in the chimney above the brick-work, and the other will enter into the hold, or any other part of the ſhip; the upper end of this tube then being heated, the draught of air will be ſupplied from below, as in the other caſe. This likewiſe was tried on board the hulk, with an iron tube about two inches and an half in diameter, and the lighted candles held at the bottom of this tube were extinguiſhed as faſt as by any of the others.

It may be objected, that a number of tubes take up too much room, eſpecially in merchants ſhips, and are ſubject to be broken or injured by loading or unloading: to remedy which it is adviſeable, that only one tube of a convenient ſize be made faſt unto the ſide of the aſh-pit, and, as ſoon as it comes through the main deck, to compreſs it (a circular or any other form being equally uſeful) not too cloſe; and it may be divided into as many ramifications as may be thought neceſſary, (eſpecially as the bread-room, ſtore-room, &c. cannot be kept too ſweet, a branch for each of theſe) and theſe branches may be carried between the beams which ſupport the deck, till they come to the ſide of the ſhip, and there be let down likewiſe between the beams into the places intended; by which contrivance their operation will not in the leaſt be obſtructed, and the tubes be ſecured from any accident.

The ſimplicity of this machine, it being ſo little cumberſome, its operation without any labour to the ſeamen, the ſmall expence to put it in execution, and maintain it, beſides the before-mentioned conſiderations, are other arguments for its general uſe.

Continuation of the hiſtorical account of a new method, &c.

SIR,

SINCE my firſt letter to you, giving an hiſtorical account of my method for extracting foul air out of ſhips, &c. I have made ſuch improvements in it, that I am convinced it is now perfect, and will produce all the benefits that can be expected from a free circulation of freſh air in cloſe places;

with-

without any of thoſe imaginary inconveniences, that by ſome few were apprehended from it. And my conviction does not ariſe from the truth of the principles alone, on which it is founded; but likewiſe from impartial experiments made with my machine during long voyages in ſeveral parts of the world; and ample teſtimonials of its ſalutary effects, wherewith I have been honoured; the moſt material of which you will find at the foot of this letter.

I have now the ſatisfaction to inform you, that my invention has at length ſurmounted all obſtacles through the wiſdom and zeal of the preſent right honourable the lords of the admiralty, and the right honourable and honourable the principal officers and commiſſioners of his majeſty's navy, who, having taken the whole affair into their ſerious conſideration, were ſo thoroughly ſatisfied of the great advantages that muſt accrue to the nation from the faithful execution of my ſcheme; that the ſaid principal officers and commiſſioners of his majeſty's navy have contracted with me for fixing my engine on board his majeſty's ſhips, whether laid up, or in commiſſion: for which act of general concern, as I well know the warmth of your heart for the good of our country, I doubt not but you will readily concur with me in making cordial acknowledgments to their lordſhips, and thoſe honourable gentlemen in the name of the publick.

Your's, &c.

SAMUEL SUTTON.

Extract from the right honourable the lord Anſon's Voyage round the world, P. 36. of the edition in 4to, ſhewing the want of an engine to extract the foul air.

THE captains of the ſquadron repreſented to the commodore, that their ſhips companies were very ſickly, and that it was their opinion, as well as their ſurgeon's, that it would tend to the preſervation of the men to let in more air between decks; but that their ſhips were ſo deep, they could not poſſibly open their lower ports. On this repreſentation, the commodore ordered ſix air-ſcuttles to be cut in each ſhip, in ſuch places where they would leaſt weaken it.

And on this occaſion I cannot but obſerve, how much it is the duty of all thoſe, who either by office or authority, have any influence in the direction of our naval affairs, to attend to this important article, the preſervation of the lives and health of our ſeamen. If it could be ſuppoſed, that the motives of humanity were inſufficient for this purpoſe; yet policy, and a regard to the ſucceſs of our arms, and the intereſt and honour of each particular commander, ſhould naturally lead us to a careful and impartial examination of every probable method propoſed for keeping a ſhip's crew in health and vigour. But hath this been always done? Have the late invented plain and obvious methods of keeping our ſhips ſweet and clean, by a conſtant ſupply of freſh air, been conſidered with that candour and temper which the great benefits promiſed thereby ought naturally to have inſpired? On the contrary, have not thoſe ſalutary ſchemes been often treated with neglect and contempt? And have not ſome of thoſe, who have been entruſted with experimenting their effects, been guilty of the moſt indefenſible partiality, in the accounts they have given of theſe trials? Indeed, it muſt be confeſſed, that many diſtinguiſhed perſons, both in the direction and command of our fleets, have exerted themſelves on theſe occaſions with a judicious and diſpaſſionate examination, becoming the intereſting nature of the inquiry; but the wonder is, that any could be found irrational enough to act a contrary part, in deſpite of the ſtrongeſt dictates of prudence and humanity. I muſt however own, that I do not believe this conduct to have ariſen from motives ſo ſavage, as the firſt reflection thereon does naturally ſuggeſt: but I rather impute it to an obſtinate, and in ſome degree ſuperſtitious, attachment to ſuch practices as have been long eſtabliſhed, and to a ſettled contempt and hatred of all kinds of innovations, eſpecially ſuch as are projected by landmen, and perſons reſiding on ſhore.

Teſtimonials of the advantages and ſucceſs of my machines for purifying the air in ſhips, and other cloſe places.

NUMB. I.

Extract of a letter from rear-admiral Boſcawen to Mr. Corbett, dated in Table-bay, 9th April, 1748.

THE ſquadron, as well as the troops, who are with me, are ſurpriſingly healthy, and have been ſo in general our whole paſſage: which I attribute in a great meaſure to our having touched at the iſlands, where I procured refreſhment. ——But at the ſame time I cannot help thinking, the air-pipes fixed in the men of war have been of great ſervice in this particular, by purifying the air between decks, and thereby preventing the ſcurvy.

In addition to what I have ſaid above of the air-pipes, I cannot help obſerving to their lordſhips, that the bulge-water on board the Namur in particular, has not been the leaſt offenſive the whole paſſage; though it was ſo bad when we laſt went into Portſmouth harbour, that three or four men were like to be ſuffocated, by only coming near the well: and therefore I cannot but recommend them as things highly uſeful on board his majeſty's ſhips.

NUMB. II.

MR. Joſeph Hatton, carpenter of the Warwick man of war, during her voyage to Guinea, and the Weſt-Indies, mentioned above p. 19, declared at the navy-board, that on the accident of breaking the chain of their pump, it fell with a kink in the chain, ſo that it could not be got up or down; wherefore he was obliged to go into the well, in order to cut a ſcuttle in the pump to clear the kink: that he remained in the well near five hours in a conſiderable depth of water, without any ill effect on his health; which he imputes to the pipes being fixed on board the ſaid ſhip, for extracting the foul air.

NUMB. III.

CAPTAIN Petre, commander of the Sandwich, in the ſervice of the Eaſt-India company, on board of which ſhip Mr. Sutton had conſtructed one of his machines, declared at the navy-board, that on his return from a China voyage in 1747, when he put in at Ireland, he ordered ſome of the bulge-water to be brought up; and it differed not in ſmell from other common ſea-water, but differed in colour as the liquor of bohea from green tea.

NUMB. IV.

Extract of a letter from captain William Liſle, commander of his majeſty's ſhip the Vigilant, at the Cape of Good Hope, April the 10th, 1748.

I Gave you an account of all that occurred till I left Madeira, in a letter from thence: however, that you may form a better idea of the tedious paſſage to this place, I ſhall juſt mention the dates of our departure from the ſeveral ports we touched at in our paſſage. We left Spithead the ſecond of November, Liſbon the twenty-fourth of January, and arrived at the Cape of Good Hope the twenty-ſecond of March; by which you may obſerve, that our paſſage from Madeira to this place was juſt eleven weeks, and our whole voyage from England full five months, if we fix each month at twenty-eight days: which is a long time to be getting but little more than half-way to our journey's end; but though long, yet it has been attended with very few bad circumſtances: and particularly in regard to the health of the ſeveral ſhips companies, and all the troops in general, never were people more healthy; which I cannot but ſuppoſe is entirely owing to the new-invented ventilators[e], and the large quantity of muſtard-ſeed allowed by the government to the ſeamen, by way of experiment. The Dutch who reſide here, ſpeak of it as a miracle, and make it the chief ſubject of their converſation.

An abſtract of the letters patent, granted by his majeſty, for the aforeſaid invention.

GEORGE *the Second, by the grace of God*, of Great Britain, France, and Ireland, king, defender of the faith, &c. *To all*, to whom theſe preſents ſhall come, greeting, *Whereas* our truſty and well-beloved Samuel Sutton, of our city of London, brewer, hath, by his petition, repreſented unto us, that he has after long ſtudy, much pains, great expence, and repeated experiments, found out, and brought to perfection, a new invention or method for extracting foul air out of ſhips by means of fire, and will equal-y contribute to the removing of all noxious air whatſoever, and may be conveniently applied to mines and caverns in the earth, dungeons, priſons, and all infected places; that the ſaid invention may be uſed in hot-houſes and walls, which will greatly warm the earth, for the ſpeedy production of its fruits, and alſo in granaries for the preſervation of corn and grain; that the ſaid invention will greatly tend to the preſervation of the lives of great numbers of our ſubjects, and be of publick uſe and benefit to this our kingdom in general: and as the petitioner is the firſt and ſole diſcoverer of the ſaid invention, or method, and alſo, in regard to the great expence of money and time, the petitioner has ſuſtained, in making ſo valuable a diſcovery; he therefore moſt humbly prays us, that *We* would be pleaſed to grant him our royal letters patent, for the ſole uſe and benefit of his ſaid new invention, within that part of our kingdom of Great Britain called England, and the dominion of Wales, and town of Berwick upon Tweed, and in our plantations in America, for the term of fourteen years, according to the ſtatute in ſuch caſe made and provided: *We* being willing to give encouragement to all arts and inventions, which may be for the publick good, are graciouſly pleaſed to condeſcend to the petitioner's requeſt. *Know ye* therefore, that *We* of our eſpecial grace, certain knowledge, and meer motion, *have* given and granted, and by theſe preſents for us, our heirs and ſucceſſors, *do* give and grant unto the ſaid Samuel Sutton, his executors, adminiſtrators, and aſſigns, our eſpecial licence, full power, ſole privilege, and authority, that he the ſaid Samuel Sutton, his executors, adminiſtrators and aſſigns, and every of them, by himſelf, and themſelves, or by his and their deputy or deputies, ſervants or agents, or ſuch others as he the ſaid Samuel Sutton, his executors, adminiſtrators, or aſſigns, ſhall at any time agree with, and no others, from time to time, and at all times hereafter, during the term of years herein expreſſed, ſhall and lawfully may make, uſe, exerciſe, and vend his ſaid invention, within that part of our kingdom of Great Britain called England, our dominion of Wales, and town of Berwick upon Tweed, and our colonies and plantations in America, in ſuch manner, as to him the ſaid Samuel Sutton, his executors, adminiſtrators, and aſſigns, or any of them, ſhall in their diſcretions ſeem meet: *and* that the ſaid Samuel Sutton, his executors, adminiſtrators, and aſſigns, ſhall and lawfully may have and enjoy the whole profit, benefit, commodity, and advantage, from time to time, coming, growing, accruing, and ariſing, by reaſon of the ſaid invention, for and during the term of years herein mentioned,

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[e] N. B. Theſe are Mr. Sutton's air-pipes.

tioned, *To have, hold*, exerciſe, and enjoy the ſaid licence, powers, privileges, and advantages herein before granted, or mentioned to be granted, unto the ſaid Samuel Sutton, his executors, adminiſtrators, and aſſigns, for and during, and unto the full end and term of fourteen years, from the date of theſe preſents next, and immediately enſuing, and fully to be compleat and ended, according to the ſtatute in ſuch caſe made and provided. *And* to the end, that he the ſaid Samuel Sutton, his executors, adminiſtrators and aſſigns, and every of them, may have and enjoy the full benefit, and the ſole uſe, and exerciſe, of the ſaid invention herein before declared; *We* do by theſe preſents, for us, our heirs and ſucceſſors, require, and ſtrictly command all and every perſon, and perſons, bodies politick and corporate, and all other our ſubjects whatſoever, of what eſtate, quality, degree, name, or condition ſoever they be, within that ſaid part of our kingdom of Great Britain, called England, our dominion of Wales, and town of Berwick upon Tweed, and our colonies and plantations in a America aforeſaid, that neither they, nor any of them during the continuance of the ſaid term of fourteen years hereby granted, either directly, or indirectly, do make, uſe, or put in practice the ſaid invention, or any part of the ſame ſo attained unto by the ſaid Samuel Sutton as aforeſaid, nor in any wiſe counterfeit, imitate, or reſemble the ſame, nor ſhall make, or cauſe to be made, any addition thereunto, or ſubſtraction from the ſame, whereby, to pretend himſelf, or themſelves the inventor or inventors, deviſor or deviſors thereof, without the licence, conſent, or agreement of the ſaid Samuel Sutton, his executors, adminiſtrators, or aſſigns, in writing under his or their hands and ſeals, firſt had and obtained in that behalf, upon ſuch pains and penalties as can or may be juſtly inflicted on ſuch offenders, for their contempt of this our royal command; and further, to be anſwerable to the ſaid Samuel Sutton, his executors, adminiſtrators, and aſſigns, according to law, for his and their damages thereby occaſioned. *And moreover we do* by theſe preſents for us, our heirs and ſucceſſors, will and command all and ſingular the juſtices of the peace, mayors, ſheriffs, bailiffs, conſtables, headboroughs, and all other officers, and miniſters whatſoever of us, our heirs and ſucceſſors, for the time being, that they or any of them do not, nor ſhall at any time hereafter, during the ſaid term hereby granted, in any wiſe moleſt, trouble, or hinder the ſaid Samuel Sutton, his executors, adminiſtrators, or aſſigns, or any of them, or his, or their deputy, ſervants, or agents, in or about the due and lawſul uſe or exerciſe of the aforeſaid invention, or any thing relating thereto.

And laſtly, We do by theſe preſents, for us, our heirs and ſucceſſors, grant unto the ſaid Samuel Sutton, his executors, adminiſtrators, and aſſigns, that theſe our letters patent, or the inrollment or exemplification thereof, ſhall be in and by all things good, firm, valid, ſufficient and effectual in the law, according to the true intent and meaning thereof, and ſhall be taken, conſtrued, and adjudged, in the moſt favourable and beneficial ſenſe, for the beſt advantage of the ſaid Samuel Sutton, his executors, adminiſtrators, and aſſigns, as well in all our courts of record as elſewhere, and by all and ſingular the officers and miniſters whatſoever of us, our heirs and ſucceſſors, in that part of our ſaid kingdom of Great Britain called England, or dominion of Wales, and town of Berwick upon Tweed, and our colonies and plantations in America aforeſaid, and amongſt all and every the ſubjects of us, our heirs, and ſucceſſors, whatſoever and whereſoever, notwithſtanding the not full and certain deſcribing the nature or quality of the ſaid invention, or of the materials thereto conducing and belonging. *In witneſs* whereof we have cauſed theſe our letters to be made patent. *Witneſs* ourſelf at Weſtminſter, the ſixteenth day of March, in the ſeventeenth year of our reign.

By writ of privy ſeal.

COCKS.

A DIS-

A DISCOURSE ON THE SCURVY.

THE Scurvy is a name given to ſo many diſorders of the body ſeemingly of a different kind, that it may juſtly be ſaid to be a manifold and complicated diſeaſe. The chief ſymptoms of it however are clearly deſcribed by ſeveral authors, which are ſuch as theſe; the gums rot firſt; then the ſkin is defaced with livid and black ſpots; ulcers enſue, eſpecially in the ſwelled legs; and theſe are with difficulty, if ever, cured. In the laſt ſtage of the diſtemper, even the bones become carious.

It is therefore very plain, that this malady is a kind of corruption of the blood, and the whole maſs of the bodily humours. This, when the cauſe is long continued, increaſes to a degree of putrefaction. All writers are agreed in their opinion, that it is a northern diſeaſe; imputing it to the cold and moiſt air of thoſe climates, together with the uſe of ſtagnating and ſaltiſh waters, and the unwholeſome food of hard, dried, and ſalted meats. They therefore obſerve that it rages moſt, even to be, in a manner univerſal, among the inhabitants of the Baltick ſea, in Finland, Norway, Denmark, and the places adjacent to the Germanick ocean. And indeed not only the new Latin name, ſcorbutus, but our Engliſh one too, is plainly made from the Saxon ſchorbock, or ſchorbuck, denoting a griping or tearing of the belly [a].

This is the ſame diſtemper, which Pliny, from the ulcers in the mouth and legs, calls by the name of ſtomacace, (or rathe ſtomocace) and ſceletyrbe; aſcribing it to the drinking of bad waters ; and for which, he ſays, the herba Britannica, which is our hydrolapathum, or water-dock, was found to be a remedy [b].

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[a] Vid. Eugalen de Scorbuto, & in primis Sennert. Lib. iii. Part v.

But long before this, Hippocrates [c] himſelf took notice of this diſeaſe, as a diſtemper of the ſpleen, proceeding very much from cold, raw, and turbid waters.

Such is this diſtemper at land. At ſea, in long voyages, it is much more violent ; ſo far, that many are of opinion, that upon the two elements it is a malady of a different kind. But it plainly appears from comparing what has been ſaid of that at land, with what I am going to mention of the ſame at ſea, that the difference is only in the degree of malignity.

The hiſtory of the progreſs of this cruel enemy is ſo judiciouſly and exactly related in lord Anſon's Voyage round the world [d], when he came into the South ſea, where his men were in a moſt terrible manner afflicted with it, that I cannot give a more lively deſcription of it, than by taking out of this moſt entertaining and inſtructive book, the moſt material circumſtances, which occurred in its ſeveral ſtages. This I am the better enabled to do, becauſe being incited by the extraordinary events to make a full enquiry into this whole affair, I have not only had the honour of diſcourſing with his lordſhip upon it, but have alſo been favoured with the original obſervations of his two ingenious and ſkilful ſurgeons [e], from which I have leave to tranſcribe whatever I find to my purpoſe.

The firſt appearances are much the ſame in the two diſeaſes at land and at ſea ; but at ſea they ſoon run to a much higher degree. Nothing is more ſurpriſing than the malignity of this, as it were corroſive, poiſon, exerting itſelf ſo far, that the ſcars of wounds, which had been many years healed, were often forced open again. Nay the callus of broken bones, which had been completely formed for a long time, was found diſſolved, and the fracture ſeemed as if it had never been conſolidated.

This malady was likewiſe accompanied with many other dangerous ſymptoms, particularly putrid fevers, pleuriſies, the jaundice, an obſtinate coſtiveneſs, and, at the latter end, a difficulty of breathing. This laſt was found to be the moſt deadly of them all : for it never was without ſuch a faintneſs and weakneſs, that many expired upon the leaſt motion, and endeavouring to get out of their hammocks, died before they could reach the deck.

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[b] Nat. Hiſtor. Lib. xxv. Sect. vi.

[c] De internis Affection. Sect. xxxiv. & de Aërib. Aquis & Locis. Sect. x.

[d] Pag. 100, &c.

[e] Mr. Ettrick and Mr. Allen.

Moreover, a ſtrange dejection of the ſpirits, with ſhiverings, tremblings, and dreadful terrors on the ſlighteſt accidents, was ſo conſtant an attendant, that whatever diſcouraged the ſick never failed to add new force to the diſtemper.

Such are the ſtrokes of this compounded calamity; and many more might be enumerated: but it is time to proceed, and to enquire into the manner, by which they are produced.

It is certain, that ſuch bad diet as has been mentioned, will corrupt the blood and humours; but nothing is clearer from the whole hiſtory of this voyage, than this, that the air is, even more than any other agent, concerned in bringing on the miſchief [f]. It may indeed juſtly ſeem ſtrange, that the writers of phyſick ſhould not have obſerved ſo remarkable a cauſe; but they deſcribed the land ſcurvy only. Nay, ſo great was the efficiency of the aërial fluid, that even a warmer climate did not mitigate the ſcorbutick virulency; neither did freſh proviſions, and plenty of wholeſome rain-water avail; although theſe are certainly of great importance in preſerving the body from the fatal diſorder. Of ſo much conſequence it is to reſiſt the firſt approaches of an enemy.

Now the manner, in which the aforeſaid cauſes act, is this. Whoever underſtands the uſe of reſpiration, and the way by which the ſeveral offices neceſſary to life are performed by means of it, will readily comprehend how the ſea air acquires ſuch noxious qualities.

To ſet this in a clear light, it muſt be obſerved, that air entering into the lungs does by its gravity and elaſticity preſs upon the blood circulating in the veſſels there. The effect of this preſſure is two-fold; firſt, a comminution and diviſion of it into ſmaller particles; ſecondly, ſome ſubtle elaſtick matter paſſes into the blood, and exciting in it an inteſtine motion, diſpoſes and prepares it for the ſecretions of ſeveral liquors, when, in its courſe round the body, it arrives at the glands contrived for the ſeparation of ſuch and ſuch juices.

Whatever therefore alters this gravity and elaſticity, makes the air unfit for the purpoſes, for which it was deſigned. In the firſt place, moiſture weakens its ſpring; next, a combination of foul particles, ſuch as are contained in the breath of many perſons crowded together, and ſome perhaps diſeaſed; then, the filthineſs of water ſtagnating in the bottom of the ſhip; laſtly, ſalts imbibed from the ſea, ſome of which may probably have proceeded from putrified animals in that element, may inſinuate themſelves into the blood, and, in the nature of a ferment, corrupt its whole maſs. Neither is it amiſs to add, that the animal ſpirits themſelves muſt neceſſarily partake of the vitious diſorder of the fluid, from which they are derived. This is plain from that unaccountable faintneſs, and weakneſs of the body, and dejections of mind, which, as we have before taken notice, accompany the other ſymptoms.

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[f] See Voyage, p. 294.

It is needleſs to ſhew how all the enumerated complaints, and indeed many more, may follow upon ſuch a diſturbed ſtate of things, eſpecially when the other mentioned cauſes concur. It may be very ſatisfactory to put down the obſervations, which the above named ſurgeons made upon the blood of their patients, and upon the diſſection of dead bodies, in the ſeveral ſtages of the diſtemper.

In the beginning, as it flowed out of the orifice of the wound, it might be ſeen to run in different ſhades of light and dark ſtreaks. When the malady was increaſed, it ran thin, and ſeemingly very black, and after ſtanding ſome time in the porringer, turned thick, of a dark muddy colour, the ſurface, in many places, of a greeniſh hue, without any regular ſeparation of its parts. In the third degree of the diſeaſe, it came out as black as ink, and though kept ſtirring in the veſſel many hours, its fibrous parts had only the appearance of a quantity of wool or hair floating in a muddy ſubſtance.

In diſſected bodies, the blood in the veins was ſo entirely broken, that by cutting any conſiderable branch, you might empty the part, to which it belonged, of its black and yellow liquor. When found extravaſated, it was of the ſame kind. And laſtly, as all other kinds of hæmorrhages are frequent at the latter end of the calamity, the fluid had the ſame appearance, as to colour and conſiſtence, whether it was diſcharged from the mouth, noſe, ſtomach, inteſtines, or any other part.

The effects we mentioned of the violence of the ſcorbutick humour being ſo malignant as to open the ſcars of old wounds, and diſſolve the calli of fractured bones, which had for a long time been formed, appear to many to be quite incredible; the rather, becauſe, as they commonly ſay, a bone thus reunited is ſtronger in that part than in any other of the ſame joint. This indeed, I dare venture to affirm, is not true in fact. The caſe is thus: a callus is no more than a kind of cementation made by filling up the ſpace between the broken ends of the bone, with the nutritious juice from the part. This when nicely examined, is found to be more porous, and to have leſs ſolidity though the bone often appears bigger than the part above and below it ; the fibres are ſmaller, ſhorter, and not ſo regularly diſpoſed as in the natural texture. In ſhort, a callus is an imperfect oſſification. For this reaſon, when the nutritious particles themſelves have acquired a corroſive acrimony, they may, like a menſtruum, work upon and break the texture of this ſuperadded cement. Which is indeed a moſt ſurpriſing phænomenon.

It is proper after all to obſerve, as a confirmation of this reaſoning, that although the callus is diſſolved by the diſeaſe, yet upon the patient's recovery, it is gradually formed again, in proportion to his coming to a right habit of body. I have before me a remarkable inſtance of this kind. A ſailor had one of his clavicles fractured in December, which was immediately reduced, and ſoon united. The dreſſings were taken off in January, and he made uſe of his arm as before. In the following April, as he was ſuſpending his body by the arms, the ſame clavicle was diſunited, and the callus gave way as at firſt. He at that time complained of ſome ſymptoms of the Scurvy ; which daily increaſed till June following. At that time he was carried aſhore at the iſland of Juan Fernandez. The bandages being removed, the fracture appeared in the ſame condition as when the accident firſt happened, without the leaſt remains of a callus : notwithſtanding the proper applications he could not uſe his arm, until the middle of October ; the callus having continued more than three months in a flexible ſtate. From that time, by the uſe of a vegetable diet, and living on ſhore, he gradually recovered from the diſtemper ; the callus was confirmed, and his uſual ſtrength returned.

But it is time to come to the cure ; which will be, firſt to prevent the attacks ; and in the next place, to remove the effects of this virulent evil.

The firſt care to be taken is of the diet. And here I muſt take the liberty to make ſome obſervations upon the manner of victualling our ſhips. The trials already made, as I have been informed, of Mr. Lowndes's ſalt made from brine, prove it to be much preferable, for ſalting proviſions, both fleſh and fiſh, to that made from ſea-water, even to the bay ſalt. Some experiments of its uſe I have made myſelf ; and our college, being conſulted by the lords of the admiralty, gave their opinion in its favour. There is in this nothing of that noxious quality, whatever it be, which is always found in the marine ſalt, and cannot, by any known methods, be ſeparated from it; and which, as we ſee, makes the ſea air, as well as its water, unwholeſome. And I cannot but ſay, that I am ſorry to ſee ſome of our phyſicians, of late years, ſo fond of preſcribing the drinking of it to their patients, particularly in ſcrophulous diſtempers. I am well aſſured, that it has ſometimes brought on ſcorbutick ſymptoms, beſides other miſchiefs.

I muſt add, that if, inſtead of our ſalt fiſh, ſtock-fiſh, which is dried without any ſalt, were provided, it would be more wholeſome. The Dutch do ſo; and alſo, in lieu of oatmeal, they put on board gort, which is, as I have been informed, a kind of barley ground; and is not ſo hot and drying as oatmeal.

I will here relate what that experienced and brave admiral, Sir Charles Wager, once told me in a diſcourſe I had with him concerning the health of our ſeamen. He ſaid, that one year, when he commanded our fleet in the Baltick, his ſailors were terribly afflicted with the Scurvy; but he obſerved that the Dutch ſhips, then in company with ours, were much more free from this diſeaſe. He could impute this to nothing but their different food, which was ſtock-fiſh and gort; whereas ours was ſalt-fiſh and oatmeal. He was then come laſt from the Mediterranean, and had, at Leghorn, taken in a great quantity of lemons and oranges. Recollecting, from what he had often heard, how effectual theſe fruits were in the cure of this diſtemper, he ordered a cheſt of each to be brought upon deck, and opened every day. The men, beſides eating what they would, mixed the juice in their beer. It was alſo their conſtant diverſion to pelt one another with the rinds; ſo that the deck was always ſtrewed and wet with the fragrant liquor. The happy effect was, that he brought his ſailors home in good health.

It is very commonly known, that, in our Eaſt-India ſhips returning home, the men are very much affected this way, and that upon their very approach to the iſland of St. Helena, they are ſtrangely relieved by the freſh odoriferous air; and perfectly recovered, after ſome days, by eating the fruits we have mentioned, and living chiefly upon the vegetables, which kind nature has ſupplied that place with in profuſe plenty.

What has been ſaid may ſerve for a very good proof of the reaſonableneſs of the advice given ſome years ago, by our college, to the lords of the admiralty, viz. that a quantity of wine-vinegar ſhould be allowed to the company of every ſhip.

This qualifies the ſalt of the food, and makes ſome amends for the want of ſub-acid fruits. But I muſt remark, that the vinegar of ſtrong beer has neither the flavour nor the virtue of that from wine; and ought indeed to be forbidden our tables.

I ſhall conclude what I have to ſay with regard to feeding on herbs, in the Scurvy, with a remarkable relation, contained in a book publiſhed, not many years ſince, by a Dutch phyſician, on this ſubject [g]. A ſailor, in one of the Greenland ſhips, was ſo entirely broken, and diſabled by this diſeaſe, that his companions, when the fiſhing was over, put him into a boat, and ſent him aſhore; leaving him there to periſh, without the leaſt expectation of a recovery. The poor wretch had quite loſt the uſe of his limbs; he could only crawl about upon the ground: this he found covered with a plant, which, having nothing elſe to ſupport life, he continually graſing like a beaſt of the field, plucked up with his teeth. Every country is, by the bounty of providence, provided with antidotes againſt the diſeaſes, to which its inhabitants are chiefly liable. In a ſhort time, he was by this means perfectly recovered to his ſtrength, and after his return home, related the fact to this writer. It was ſoon after obſerved, that this herb was cochlearia, or ſcurvy-graſs. Some of it was, for inquiry's ſake, brought over hither in pots, and was found to be ſomewhat different from that of our country, being more mild, and not ſo pungent and ſharp.

Thus much for the vegetable diet. I muſt add, that beſides the herbs and fruits mentioned, there are many others very wholeſome in this diſeaſe. Some like cochlearia, of a ſubtle and volatile juice, as the naſturtium, beccabunga, or brooklime; others more cooling, and therefore more proper in hot conſtitutions, or feveriſh heats, as ſorrel, endive, lettuce, purſlain, &c. And indeed, I think it will be beſt to join in uſe the hotter with the colder, that they may qualify each other; eſpecially, becauſe the acid fruits were found, in lord Anſon's voyage, to be of moſt extraordinary benefit [h].

Neither ought it to be omitted, that milk of all kinds, when it can be had, and its whey, which may be clarified with ſome of the herbs now named, is an antiſcorbutick food and phyſick.

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[g] Obſervationes circa ſcorbutum, auctore Johanne Fred. Bachſtrom. Lugduni Batavor. MDCCXXXIV. 12mo. p. 8.

[h] See Voyage. p. 117. and alſo p. 308.

But, as the deſign of this diſcourſe is to demonſtrate the uſefulneſs of the preceding machine, it will be right to add ſome illuſtrations and obſervations to thoſe I formerly made in my paper read before the royal ſociety, and reprinted in Mr. Sutton's book [i].

I have already taken notice, that the reaſon why the writers upon this diſeaſe have not aſcribed it more to the air, than they have done, muſt be, becauſe they were more acquainted with it at land than at ſea. Now, it is very plain, that as the hurtful qualities of the ſea air muſt be heightened by its being cloſely confined, without due circulation, particularly when it is alſo ſaturated with effluvia from the breath of many perſons almoſt ſtifled up together; ſo the continual ſhifting and changing of this element, muſt of courſe be attended with great advantages; nay ſuch perhaps, as one unacquainted with the nature of things, would hardly be brought to believe. But I refer to my mentioned paper, and Mr. Sutton's additions.

I muſt laſtly remark, that it is almoſt incredible how ſoon the ſick, even though juſt dying, begin, when brought aſhore, to feel the ſalutary effects of the land: for whereas the admiral had buried twenty-one men in two days, before his arrival at the iſland of Tinian, yet he did not loſe above ten, during his two months ſtay there [k]. For ſo healing, and contrary to the malignity and bad qualities of the ſea-air was that of the land, that the patients, even upon their being expoſed upon the ground, immediately recovered.

But it may ſeem ſtill more marvellous, that the vapour of the cold earth itſelf ſhould alſo contribute to their ſpeedy recovery. Lord Anſon told me, that one of his men, who rowed the boat aſhore, was ſo weak, that he fell down at the oar almoſt dead: when landed, the poor man deſired his mates that they would cut a piece of turf out of the ſoft ground, and put his mouth to the hole: upon doing this, he came to himſelf, and grew afterwards quite well. This puts me in mind of what I have formerly ſeen done by the boys on Shrove-Tueſday, the too cruel anniverſary martyrdom of cocks; when one of theſe creatures was knocked down and expiring, it was ſometimes brought to life again, by inſtantly putting its head, for a ſhort time, into a freſh-made hole in the earth.

This ſudden good effect of freſh air affords a plain proof of what we have before ſaid, that beſides the blood, the animal ſpirits themſelves are very much affected in this diſeaſe: for ſuch immediate relief could only be given by the means of this active fluid, the main inſtrument of all vital motions. And as the protracting this advantage in the open air is the cure at hand; ſo the making a conſtant circulation even of that, which is not ſo wholeſome, in the ſhip, muſt do a great deal towards the prevention of the diſtemper.

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[i] Page 41.

[k] See Voyage, p. 307.

R. M.

MEDICAL

PRECEPTS

AND

CAUTIONS.

PREFACE.

I HAVE perſuaded myſelf, that I ſhould perform a work, neither entirely void of uſe, nor foreign to the duties of my profeſſion, if I made the publick partakers of the principal helps againſt moſt diſeaſes, which I had either learned by long experience, or deduced from rational principles. But my purpoſe is to lay down precepts of the art, and methods of cure, rather than definitions and deſcriptions of diſeaſes; and to propoſe medicines confirmed by practice, not mere conjectures. And as it is not my intention to write a complete ſyſtem of medicine, I ſhall not ſtrictly confine myſelf to the uſual order obſerved in medical treatiſes; for at my leiſure hours I have peruſed my looſe papers, and from them have extracted ſuch things, as I thought might prove uſeful hereafter; at the ſame time calling in my memory to my aſſiſtance for whatſoever I had obſerved to be ſerviceable, or prejudicial, in each particular diſtemper. For ſuch was the riſe of medicine, by the recovery of ſome patients, and the loſs of others, gradually diſtinguiſhing pernicious from ſalutary things [a]. Wherefore I ſhall not enquire into the very conſtitution (if the expreſſion may be allowed) of the medical art; nor enter into the diſpute, how far it is either rational or empirical: on which topicks I refer my readers to Celſus, who has ſtated the arguments of phyſicians for their reſpective ſects with great candour, and ſums up the whole by delivering his own opinion with equal judgment and perſpicuity [b]. Nor is this little work, which has been often interrupted by, and partly compoſed amidſt the hurry of buſineſs, thrown out as a bait to catch fame. For it has long ſince been obſerved by the great parent of medicine, that our art has acquired more blame than honour [c]. And indeed it is the general temper of mankind, to be exceſſively profuſe of their reproofs, of their commendations extremely parſimonious. But this complaint made in behalf of medicine will probably appear ſlight, if compared with the following, which he makes in another place: that the phyſician has dreadful objects before his eyes, very diſagreeable ſubjects in his hands, and takes great uneaſineſs to himſelf from the calamities of others [d]. Now, what can be more humane, or more worthy even of a chriſtian, than to declare, that he feels the calamities of others as ſenſibly, as if they were his own.

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[a] Sic medicinam ortam, ſubinde aliorum ſalute, aliorum interitu, pernicioſa diſcernentem à ſalutaribus. Celſus in Præfat.

[b] Ibidem.

[c] Ἔγωγε δοκέω πλείονα μεμψιμοιρίαν ἢ τιμὴν κεκληρῶσθαι τὴν τέχνην. Hippocrates in epiſt. ad Democritum.

However, the very nature of my deſign compelled me to take notice of the errors of other phyſicians; but I have been very careful throughout the work, to do it with the ſame equity, with which I would deſire to have my own faults corrected. Our art is frequently obliged to rely on conjectures; nor is it to be expected that any one perſon will conſtantly hit the mark. And therefore I have not been aſhamed to acknowledge, and put my readers in mind of, ſome errors, which I have committed either through ignorance. or want of due attention. For, as Celſus ſays, a plain confeſſion of a real error is commendable, and more eſpecially in that performance, which is publiſhed for the benefit of poſterity [e]. The reader will eaſily perceive, that I have endeavoured not only to expreſs the ſenſe of Celſus, but to employ his very words and phraſes, or cloſe imitations of them at leaſt, whenever the ſubject would allow it; and I heartily wiſh I could have done it more frequently: For what author could I chuſe to follow rather than him, who ſelected the beſt things out of the writings of the Greek phyſicians and ſurgeons, and rendered the whole into moſt pure and elegant Latin?

To conclude, the reader is deſired to take notice, that by the compoſitions of medicines, which I make uſe of in this treatiſe, I mean thoſe of the late edition of the London Diſpenſatory [f], unleſs otherwiſe ſignified.

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[d] Ὁ μὲν γὰρ ἰητρὸς ὁρέει τὰ δεινὰ, θιγγάνει τε ἀηδέων, καὶ ἐπ' ἀλλοτρίῃσι ξυμφορῇσιν ἰδίας καρποῦται λύπας. Lib de flatibus.

[e] Lib. viii. cap 4.

[f] Pharmacopœia Collegii Regalis medicorum Londinenſis. Lond. 1746. 4°. And the tranſlator of this work has taken the Engliſh names of the above-mentioned compoſitions from Dr. Pemberton's tranſlation of the ſaid Pharmacopœia. Lond. 1746. 8°.

MEDICAL PRECEPTS

AND

CAUTIONS.

INTRODUCTION.

Of the human body.

BEFORE I begin to treat of the diſeaſes of the human body, it may not be improper to give the reader a ſuccinct idea of its nature in a ſtate of health.

Wherefore, in order to form a juſt notion of the body of man, it ought to be conſidered as a hydraulick machine contrived with the moſt exquiſite art, in which there are numberleſs tubes, properly adjuſted and diſpoſed for the conveyance of fluids of different kinds. Of theſe the principal is the blood, from which are derived the ſeveral humours ſubſervient to the various uſes and purpoſes of life; and in particular that ſubtle and remarkable elaſtick fluid, generated in the brain, and known by the name of animal ſpirits, the inſtrument of ſenſe and motion: which functions it never could be capable of executing, were it not contained in proper organs. For this purpoſe the almighty Creator has formed two ſorts of fibres, the fleſhy and the nervous, as receptacles for this active principle; and each ſort of theſe is partly interwoven in the membranes of the body, and partly collected into bundles or cords, and attached to the limbs, for performing their motions with the aſſiſtance of the bones.

But this wonderful machine, incapable of putting itſelf into motion, was ſtill in want of a firſt mover: wherefore the mind is placed over it, as a ruler and moderator, and is the efficient cauſe of all ſenſe and motion. For whether this principle reſides in the head, as in its citadel ; or whether it has no fixed place, but is diſperſed all over the body, according to the opinion of Xenocrates, a diſciple of Plato [a] ; it commands within us, and directs the whole. Now, our motions, as well as our ſenſes, are twofold, internal and external : the internal have not only the vital parts, as the heart, lungs, ſtomach and inteſtines, ſubject to them, but likewiſe all the nervous membranes.

Medical writers generally make a wide difference between the motions of the vitals, and thoſe of the reſt of the parts ; imagining that the former, after they are once begun in the firſt formation of the individual, neceſſarily continue even againſt our will ; but that the latter are performed at the diſcretion of the mind, as circumſtances require. But this is a falſe notion, into which they are deceived by obſerving, that theſe natural actions continue without any ſenſible intermiſſion, even when we are little or not at all conſcious of them, through the whole courſe of life : whereas, if the thing be narrowly looked into, it will manifeſtly appear, that the reaſon why theſe vital motions ſeem not to be governed by the mind, is, becauſe being inceſſantly accuſtomed to them, we perform them ſo quick, and without attention, that we cannot eaſily check and hinder them from performing their reſpective offices. Something of this kind we experience, when, looking at the ſun, or any body that ſtrikes the eye too forcibly, we wink whether we will or not : and yet nobody doubts, but that theſe motions are effected by the direction of the mind. I could bring ſeveral other examples to confirm and illuſtrate this ſentiment ; but to avoid being tedious, I chooſe to refer the reader to a diſſertation of Dr. Porterfield, who has handled this ſubject with great perſpicuity [b], as I have ſaid in another place [c].

But this power of the mind is moſt remarkably perceptible in thoſe fevers, which are called peſtilential. For in theſe one may obſerve, that the mind hurries to the aſſiſtance of the labouring frame, fights againſt the enemy, and, with the aid of the animal ſpirits, excites new motions in the body, (though we may be inſenſible of it) in order to expel the poiſon, which is blended with the humours, through every outlet. And hence very great phyſicians have defined a diſeaſe to be a ſtruggle of nature in defence of the health of the individual

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[a] See Lactantius de opificio Dei, cap. 16

[b] See Medical Eſſays, publiſhed at Edinburgh, Vol. III. Eſſay 12. and Vol. IV. Eſſay 14.

[c] Diſc. on the Small-Pox, pag. 314.

In this manner it is, that care is taken of the whole machine, when in danger. But it is likewiſe neceſſary ſometimes to have a regard to ſome particular part; nor does the mind fail of executing its office in this caſe. Thus if a topical diſorder has happened any where; to prevent the part from being overloaded and pained, nature has provided a paſſage for the blood and humours by the adjacent veſſels. This is effected by that admirable diſpoſition of the body, whereby the blood-veſſels are interwoven and ſpread throughout every part; ſo that the blood may paſs, not only from vein to vein, but alſo from the ſmall arteries into others. And this mechaniſm is peculiarly apparent, where obſtructions are moſt to be feared; as in the head, abdomen, and the long winding ducts of the organs of generation.

Now ſuch a conſtruction of our frame is the more neceſſary, becauſe, even when a diſeaſe is not in the caſe, the very actions and cuſtoms of the body ſometimes require the humours to be conveyed with greater freedom through ſome paſſages than through others. Hence the ſame blood-veſſels become wider or narrower in different perſons, according as their manner of living hath occaſioned theſe veſſels to be more or leſs dilated by the perpetual motion of the fluids. Thus in perſons addicted to drinking, the arteries in the head, in people given to venery, thoſe in the genitals are bigger than in the ſober and continent.

And this additional remark may not be improper here, that it is almoſt impoſſible, but that the very make of the animal parts, though extremely convenient for the purpoſes of life, muſt be attended with ſome inconveniencies, in particular caſes; as in the fabrick of the univerſe, thunder, ſtorms, inundations, plagues, and other ſuch calamities neceſſarily happen ſometimes in ſome places. But as the divine Creator of the microcoſm has given us natural means of guarding againſt theſe evils; ſo he has afforded proper aſſiſtance againſt thoſe which affect our microcoſm.

Geometricians have been long intent on contriving a machine, that may be endued with perpetual motion; but have conſtantly loſt their labour. For in handy-works of this kind, ſome portion of the moving power is loſt every inſtant, by reaſon of the friction of the parts, whereby it requires to be perpetually renewed. Wherefore it is God alone who can compleat ſuch a machine; and was pleaſed that our body ſhould be a fabrick of that ſort, by diſpoſing all its powers in ſuch a manner, that they ſhould form a kind of circle, in which, at the ſame time that they perform their reſpective functions, they ſhould conſtantly and mutually repair each other.

Hence it manifeſtly appears, that the animal machine is made, not by parts, but altogether; ſeeing it is impoſſible, that a circle of motions, ſome of which depend on others, be compleated, without all their inſtruments being in their proper places. For example, how can the heart contract, to puſh the blood forward, without the aſſiſtance of the animal ſpirits; or the ſpirits be ſecreted without the brain? And ſo of all the other principal parts. Wherefore the animalcula, which by the help of microſcopes we diſcover ſwimming in the ſemen maſculinum, are really little men; which being received into the womb, are there cheriſhed as in a neſt, and grow in due time to a proper ſize for excluſion. Therefore Hippocrates ſaid very juſtly: In the body there is no beginning, but all the parts are equally the beginning and end [d].

To what has been hitherto ſaid, let me add, that every animal machine is of ſuch a nature, that there is a ſort of infinity in its conſtituent parts; by which expreſſion I mean that their fibres are ſo extremely ſmall, that we cannot diſcover the ultimate ſtamina, even by the aſſiſtance of the beſt microſcopes. Had it been otherwiſe, aliment would not be conveyed to every individual part of the body, nor could the neceſſary functions of life be performed.

Wherefore, upon the whole, health conſiſts in regular motions of the fluids, together with a proper ſtate of the ſolids; and diſeaſes are their aberrations: which as they are numberleſs, and one often produces another, it is next to a miracle, that the animal body ſhould be able to hold out to extreme old age. And hence indeed plainly appears the extenſiveneſs of the art of medicine, and how much ſuperior it is to all other arts.

Now this machine, the only one that is endued with perpetual motion, was formed by the almighty Geometrician to laſt a longer or ſhorter ſpace of time, according to the different genius's of living creatures. For a body, ſuch as ours, cannot poſſibly retain life for ever; which is not difficult to account for. Becauſe the membranous fibres of the blood-veſſels, which were made elaſtick, in order to drive their included juices forward, become gradually harder, and at length rigid; whence they are rendered incapable of executing their offices, and the ſecretions of the ſeveral parts are diminiſhed by degrees. And that the uſeleſs juices are not ſufficiently carried off by perſpiration in old age (a buſineſs very material to the continuance of life) manifeſtly appears from diſſections of the bodies of very old people; the inſides of their arteries being ſometimes found oſſified here and there, whereby they had almoſt entirely loſt their ſpringineſs; and the orifices of the natural ducts are often obſerved to be quite cartilaginous.

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[d] Εμοὶ δοκέει ἀρχὴ μὲν οὖν ȣ̓δεμία εἶναι τȣ͂ σώματος, ἀλλὰ πάντα ὁμοίως ἀρχὴ καὶ πάντα τελευτή. De Locis in homine, initio.

In confirmation of this truth, I ſhall give two remarkable examples; the firſt of which is taken from our own hiſtory. Thomas Parr, a poor labouring man, was born in a healthful part of Shropſhire, where he vigorouſly continued his daily labour to the age of an hundred and thirty years: but afterwards having loſt his ſight, he was at length brought to London; and having reſided here for ſome time, in the year 1635 he died, at the age of one hundred and fifty-two years and nine months. His body was opened by the immortal Harvey, who found all the parts in a ſound ſtate, except the brain, which was extremely firm and ſolid to the touch [e]. Thus were the veſſels in that part grown hard by age.

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The other example is recorded in our Philoſophical Tranſactions. It is an account of a worker in the mines in Swiſſerland, who died in 1723, aged one hundred and nine years and three months, ſent to the royal ſociety by Dr. John James Scheuchzer of Zurich; who upon diſſection found the exterior membrane of the ſpleen beſet with white ſpots, at firſt ſight reſembling variolous puſtules; but they were of a cartilaginous hardneſs, and raiſed ſomewhat above the ſurface of the reſt of the membrane: the articulations of the ribs with the ſternum were quite oſſified; the tendon, by which the arteries are inſerted into the heart, was either boney, or cartilaginous at leaſt; the ſemilunar valves, eſpecially of the aorta, were plainly cartilaginous; and the dura mater was about three times its uſual thickneſs, and like leather [f].

But it is time to paſs to the defects of this machine, which diſturb and deſtroy its motions.

[e] See the diſſection of Thomas Parr, at the end of Dr. Bett's book De ortu & natura ſanguinis.

[f] Phil. Tranſ. Nº 376.

CHAP. I.

Of FEVERS.

SECTION I.

Of FEVERS in general.

ALL Fevers, of what kind ſoever, are attended with a preternatural heat of the blood and humours; and this impairs the bodily ſtrength, and the vital actions. Wherefore nature raiſes all her powers, and engages the diſeaſe, as a mortal enemy: and if ſhe gets the better, ſhe drives out the cauſe of the diſorder by ſuch outlets as ſhe is able. This action is by phyſicians called the criſis of the diſeaſe. Now, what I would have here underſtood by the word nature, as alſo ſome things relating to the different ſorts of Fevers, I have explained in another place[g], and at the ſame time ſhewn, in what ſenſe phyſicians, and particularly Sydenham ſaid, that a diſeaſe is nothing elſe but a ſtruggle of nature, endeavouring by all means to exterminate the morbifick matter, for the recovery of the patient[h]. Wherefore I will premiſe ſome few thoughts on the criſes or ſolutions of Fevers.

SECTION II.

Of the crises of FEVERS.

Whereas there is no fever cured without ſome conſiderable evacuation, raiſed either by nature or by art; the phyſician ought carefully to obſerve, which way nature ſeems to intend the expulſion of the morbid matter, and aſſiſt her by all poſſible means. Now this expulſion is very frequently made through ſeveral outlets of the body at a time, and an evacuation by one outlet more or leſs checks that by another: thus a looſeneſs checks ſweat, and vice versâ. Wherefore it is the phyſician's buſineſs to diſcern, what evacuation is moſt likely to be of ſervice, and ſo to promote this, as to give the leaſt interruption poſſible to any other: for any one evacuation is not equally ſuitable to all perſons, both on account of the difference of conſtitutions, and diſeaſes; although evacuations through every emunctory are ſometimes neceſſary, as we find by experience in malignant Fevers.

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[g] See Diſcourſe on the Small-Pox, chap. 2.

[h] Obſervat. medicæ circa morborum acutorum hiſtoriam, at the beginning.

But of all ſolutions of the diſeaſe the moſt deſireable is by ſweat, next to that by ſtool and urine; the worſt is by a hæmorrhage, whether it proceed from the noſe, or from any other part: becauſe it indicates, that the blood is ſo far vitiated, that no proper ſeparation of the humour can be made.

Laſtly, ſome Fevers terminate in abſceſſes formed in the glands, which, if they happen in the decline of the diſeaſe, and ſuppurate kindly, are ſalutary. Wherefore the ſuppuration is to be forwarded by cataplaſms or plaſters, and ſometimes by cupping on the tumour; and then, if the abſceſs does not break ſpontaneouſly, it ought to be opened either with the knife or a cauſtick.

At this time this rule of practice is generally right, not to exhauſt the patient's ſtrength by evacuations of any kind. And yet in ſome caſes there is a neceſſity for drawing a little blood; as when the humours are in great commotion, and the heat exceſſive: for this remedy prudently adminiſtered, makes the tumour ripen kindly, becauſe nature has always a great abhorrence of a turbulent ſtate.

SECTION III.

Of continual FEVERS.

There is no diſeaſe, to which the uſeful precept, principiis obſta, is more applicable than to Fevers: becauſe in the beginning it is generally eaſy to do good; but when the diſtemper has gained ground, the cure is often attended with difficulty. For the opportunity is fleeting[i]; and a medicine, which early adminiſtered might have prevented the impending danger, frequently fails, when the bodily ſtrength is exhauſted by the violence of the diſeaſe. However, a patient, who applies late for aſſiſtance, is not to be abandoned to his fate; ſince it is certain, that thoſe diſeaſes, which in old times were aſcribed to the divine wrath[k], are frequently cured by natural means, even when they appear moſt deſperate. Wherefore the phyſician ought to lay it down as an abſolute rule, never to be wanting to his duty.

[i] 'O καιρὸς ὀξὺς. Hippocr. Aphor. 1. Sect. 1.

[k] See Celſus in his Preface.

And firſt, as blood-letting is a moſt excellent remedy in the beginning of all Fevers; if it has happened to be neglected for ſome days, let us conſider, whether it is ſtill proper to be ordered.

In caſe of intolerable pain in any part of the body, of difficulty of breathing, or a delirium, blood is to be taken away, according to the patient's ſtrength; with the lancet, if he is able to bear it; if too weak, by cupping; but if exceſſively ſo, by leeches And if this may be done, when the diſeaſe is got to the heighth; it ought for ſtronger reaſons to take place in the beginning. And let me obſerve by the bye, that leeches are often of vaſt ſervice in a delirium. I have alſo ſometimes found by experience, that pieces of lamb's lungs, applied warm to the head, have carried off the phrenzy, by the exſudation of the noxious or ſuperfluous humour.

But in order to a clearer comprehenſion of what I have to offer on this diſtemper, I will enumerate and briefly explain its principal kinds; leaving the reader at liberty to conſult the medical writers, eſpecially Celſus and his imitator Lommius, who have treated this ſubject profeſſedly, concerning the management of the ſick, his diet, &c.

SECTION IV.

OF FEVERS ATTENDED WITH ERUPTIONS.

Fevers attended with eruptions, require particular attention. As for the Small-Pox, Meaſles, and Plague, I have already publiſhed my thoughts on them in ſeparate treatiſes. Of the reſt the chief is

THE MILIARY FEVER.

There is no Fever, that puts on more various appearances than this. Puſtules, rough to the touch, break out, ſooner or later, all over the body; ſometimes red, ſometimes whitiſh, and again both ſorts intermixt; at one time ſmaller, at another larger and more elevated, and of a bad ſmell. Sobbing and anxiety about the heart are very frequent ſymptoms, which are often followed by a delirium and convulſions. The diſeaſe runs into a conſiderable length: and if it happens to end too ſoon, without a ſufficiently perfect criſis, it often brings on a bad habit of body. The red pimples are not ſo dangerous as the whitiſh; and the more lively their colour, they are the ſafer. Hence it appears, that this Fever is more owing to a defect in the humours, and the animal ſpirits in particular, than to any bad quality of the air; and that it requires different methods of cure according to its different circumſtances

But of what kind ſoever the puſtules are, blood is to be drawn in the beginning, if the patient has ſtrength to bear it; unleſs he be actually in a ſweat, in which caſe blood-letting is either to be omitted, or at leaſt to be put off for a day or two, or ſome other convenient time. Now red puſtules bear bleeding much better than the whitiſh: and though in both ſorts bliſters are ſerviceable, yet they are more neceſſary in the latter; and they are to be applied to the neck, head, and all the limbs, at proper diſtances of time. After all, I would adviſe the phyſician always to bear in mind, that the more ſparingly blood has been drawn, the more happily the diſeaſe generally terminates: for when the ſtrength has been exhauſted by evacuations towards the latter end, the eruption ſinks in, and the patient dies.

Nature's endeavours to expel the morbifick matter through the ſkin, are to be aſſiſted by moderately cordial medicines. Of this tribe the moſt proper are the bezoardick powder, the compound powder of contrayerva, and the cordial confection; adding nitre, in caſe of an inflammation: and this ſalt may be very advantageouſly joined to cordial medicines in almoſt all malignant Fevers, at leaſt in the beginning. Toward the decline, warm bathing is ſometimes ſerviceable, in order to bring forth the remains of the puſtules.

But if, either at the heighth, or on the decline of the Fever, the only appearance of an eruption is a vaſt number of pellucid veſicles, ſo ſmall as hardly to be ſeen; it is not ſafe to perſiſt too long in the uſe of internal medicines of this tribe; unleſs the length of the diſtemper has ſo far weakened the patient, as to render even more powerful cordials neceſſary. For ſuch little roughneſſes of the ſkin are not able to bring on a good criſis, but on the contrary, generally denote a difficult and tedious illneſs: wherefore without diſcontinuing the bliſters, the cauſe of the diſeaſe is to be carried off by other ways, eſpecially through the inteſtinal canal by gentle purges of rhubarb, or manna and Glauber's ſalt.

It is to be obſerved, that this diſeaſe is not always terminated by any one ſort of criſis. It has ſometimes one ſort, ſometimes another: and in ſome caſes ſeveral ſorts together;

as I have already ſaid, frequently happens in other malignant Fevers. Thus at the ſame time that there are other diſcharges of the morbifick matter, a thruſh ſometimes breaks out, and ſpreads all over the mouth and throat. This commonly begins with a hiccup: and if it be whitiſh and very moiſt, and occaſion a plentiful ſpitting, it is ſo far from portending any great danger, that it is a ſign of the diſtemper ending happily: but if it be of the black kind, and dry, and the ſpittle tough and little in quantity, it is of fatal omen, as it indicates the mouth and throat choaked up with ſlimy phlegm. In theſe caſes it is proper to uſe gargles made of barley-water and ſyrup of mulberries, or ſome ſuch other ſyrup, or the pectoral decoction: for repellents of all kinds are to be carefully avoided.

It may poſſibly ſeem ſtrange to ſome, that Sydenham preſcribed the bark in this Fever and the aphthæ attending it, and ſays, he always found it to anſwer his expectations [1]. But this was not a raſh practice in that ſagacious phyſician: for this Fever often intermits, when the aphthæ do not appear; but it more frequently ends upon their going off. In both caſes this excellent antidote is of very great ſervice. And in juſtice to the memory of that great man, who had accuſtomed himſelf, after the example of Hippocrates, to obſerve the return of epidemical diſeaſes, and found that they varied in the ſame ſeaſons of the year, according to the diverſity of the weather; I muſt obſerve, that he was the firſt among us who deſcribed this Fever; which, he ſays, took its riſe here in the month of February 1684, after the long ſevere froſt of the preceding winter. Hence it is probable, that it aroſe from the acrimony of the humours induced by the conſtriction of the fibres of the ſkin from cold, and the conſequent diminution of perſpiration.

SECTION V.

THE PETECHIAL FEVER.

The petechiæ, from which this Fever has its name, are broad, red ſpots, like the bites of fleas, not riſing above the ſurface of the ſkin. When they are livid or black, they are of very dangerous prognoſtick: becauſe they are really ſo many little gangrenes; and therefore the more numerous they are, the more their conſequence is to be dreaded.

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[1] See his Schedula monitoria.

The common practice of giving hot medicines in the beginning of this diſtemper, in order to raiſe ſweats, is quite wrong. It is much the ſafer way, to check the gangrenous diſpoſition of the humours by the bezoardick powder, or rather the compound powder of contrayerva, with nitre, as is above-mentioned; or to aſſiſt nature with the cordial confection diſſolved in ſimple alexeterial water: and alſo to acidulate the patient's drink with dulcified ſpirit of nitre; to repair his ſtrength with Rheniſh wine; and in fine, a very proper drink will be barley-water, with juice of lemons. And all theſe liquors are to be drank plentifully. It will likewiſe be of uſe ſometimes, to adminiſter ſome doſes of the calx of antimony and bezoardick powder mixt, in order to provoke ſweat: but the calx ſhould not be too much waſhed. Yet it is neceſſary to admoniſh, that it is not an uncommon caſe, eſpecially towards the latter end of the diſeaſe, that the patient's weak low ſtate requires warmer cordials; ſuch as Virginia ſnake root, contrayerva-root, the root of wild valerian, ſaffron, and the like. And infuſions of theſe in water will be far more convenient than their powders; eſpecially if they be mixt with a ſmall quantity of diſtilled vinegar.

SECTION. VI.

THE ERYSIPELAS.

Great attention is to be given to that Fever which is accompanied with an Eryſipelas. For in this, beſides the pain, thirſt, and reſtleſſneſs, which the patient ſuffers; the puſtules on various parts of the body ſometimes run into gangrenes.

Wherefore the firſt thing to be done is, to draw blood pretty plentifully; and then to purge once and again with gentle catharticks, as infuſion of ſena with manna. For ſuch only are proper in Fevers. And indeed there is no acute Fever, that bears repeated purging better than this, eſpecially when the inflammatory tumour has ſeized the head: for the humour ſpreads very faſt, and ſoon gains the neighbouring parts.

But it is dangerous to apply hot fomentations, in order to diſcuſs the morbifick matter; and much more ſo, to repel it with cooling ointments or liniments. But if the ſkin in any part be gangrened, that part is to be fomented with a decoction of bitter herbs, mixed with camphorated ſpirit of wine; and afterward a cataplaſm of oatmeal boiled in ſtrong beer is tobe laid on warm, and to be renewed as oft as is found neceſſary.

And to give this caution once for all; not only in acute diſeaſes, but in ſeveral chronical, which are attended with puſtules that ſuppurate, it is ſafer and better, unleſs the ſkin is the ſole ſeat of the ailment, to encourage the eruption by gentle means, or at leaſt to ſuffer it to come forth for ſome time (that is, as far as the patient can bear the uneaſineſs) than either to repel, or purge off the humour by other outlets. For there is in every kind of vicious humour ſomewhat peculiar to itſelf: and as they generally come forth by way of criſis; how much ſoever they may be diminiſhed, yet they are rarely evacuated out of the body, with relief to the ſick, by any other paſſages than thoſe pointed out by nature.

As to internal medicines, thoſe which I have recommended in eruptive Fevers, are the moſt proper in this.

I cloſe this eſſay on malignant Fevers, with a few remarks on three other celebrated medicines, viz. camphire, ſpiritus Mindereri, and muſk. And it is worth remarking that they are all powerful ſudorificks.

Camphire is vaſtly extolled by many. And indeed, not to mention other authors, that experienced phyſician Riverius has given a caſe or two, in which it was of ſignal ſervice [m]. However it is worthy of obſervation, that it was not then exhibited alone, but joined with cooling medicines (agreeable to the caution I gave, when hot medicines are given in petechial Fevers :) for camphire is very hot. Wherefore the moſt convenient way of giving it is this:

Take of camphire one drachm; grind it with a little rectified ſpirit of wine; then mix it thoroughly with half an ounce of double-refined ſugar: and afterward pour on it gradually one pint of hot vinegar.

For thus that medicine, which is otherwiſe apt to create nauſeating, is rendered more agreeable to the ſtomach, and better adapted to the diſeaſe.

Upon the ſame principles Mindererus's ſpirit [n] is likewiſe of excellent uſe in all putrid Fevers.

In fine, I have more than once experienced the good effects of muſk, eſpecially when convulſions come on: and thus I order it:

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[m] See Obſervat. medic. centaur. ii. obſ. 18.

[n] Of the Edinburgh Diſpenſatory.

Take of muſk, the cordial confection, and cinnabar of antimony, each ten grains ; mix, and with a little ſyrup make a bolus, to be repeated at proper intervals.

SECTION VII.

Of particular FEVERS.

Thoſe Fevers which are accompanied with an inflammation of any particular parts, require a treatment ſuitable to thoſe parts. I inſtance in

A PLEURISY

In which, after drawing as much blood as is neceſſary draughts with freſh-drawn linſeed-oil are of great ſervice fo eaſing the cough; nitre for allaying the heat ; for diſſolving the ſizy blood, obſtructing the ſmall canals, wild goat' blood, and volatile ſalts : and laſtly, a bliſter laid on the part affected, in order to draw forth the peccant humour The advantage of this external remedy, I firſt learnt from Sir Theodore Mayerne's practice [*] ; and I have for many years paſt uſed it with good ſucceſs. In fine, toward the decline of the diſeaſe, when the inflammation is abated, i will be proper to purge the patient gently.

But I muſt not omit to take notice, that a purulent abſceſs or empyema, from an inflammation of the exteriou membrane of the lungs, and its adheſion to the pleura, i ſometimes formed in this diſeaſe ; and more frequently ſtill in a peripneumony. In this caſe, if the tumour point outward, a cauſtick ſhould be applied to it, to let out the matter : and the ulcer is to be kept open during life. Fo I have ſeen inſtances, where, upon healing it up, and conſequently ſtopping the drain, the patient died in a little time.

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[*] De morbis internis Syntagma primum, cap. v. De pleuritide.

SECTION

SECTION VIII.

OF INTERMITTING FEVERS.

That an intermitting Fever is not carried off by the Peruvian bark with a proper degree of certainty, without premiſing a vomit or a purge, or both, is not unknown to phyſicians; but to join ſome mild cathartick to this remedy, will perhaps appear new in practice. For it is commonly thought among us, that this medicine has little or no effect, unleſs the patient be coſtive, while he takes it. But long experience has taught me, that it is quite neceſſary to add a ſmall quantity of rhubarb to this febrifuge; ſo as to procure two ſtools at leaſt every day. Nor have I ever obſerved, that this procedure has leſſened its virtue, but rather rendered it more efficacious. For although ſtrong irritating cathartics raiſe ſuch diſturbances in the blood and humours, as make the proper medicines ineffectual; yet moderate purging is attended with this good effect, that the ſtomach better digeſts whatever is taken in, whether medicines or food; whereby their fineſt and moſt wholeſome parts paſs into the maſs of blood.

The occaſion of my contriving this method of giving the bark was this. Near twenty years ago intermittent Fevers, of a worſe ſort than ordinary, were very rife, and frequently terminated in a bad habit of body, and even in a dropſy; which conſequences, when I had maturely conſidered, I thought, that this method might probably guard againſt them; nor was I deceived in my opinion. And the ſucceſs, with which it was attended, encouraged me to purſue it, whenever this diſeaſe attacked bodies loaded with groſs humours. But I was well aware of the danger of purging too much. Wherefore my cuſtom is, after having given a drachm or two of rhubarb in this manner, to omit the purgative, and continue the uſe of the febrifuge alone. And beſides the advantages already recited, I made this obſervation, that when the diſeaſe is carried off by this method, there is always leſs danger of a relapſe.

Now, with regard to this noble medicine, I have this one admonition to give, that it is not proper in any other Fevers but thoſe of the intermittent kind. For in continuals, it is ſo far from being of ſervice, that it does much miſchief; and it is pernicious alſo in thoſe hecticks, which are accompanied with ulcers of any of the internal parts; though they often have periodical returns, and much reſemble quotidian or tertian intermittents. Whence it may not perhaps appear an improbable conjecture, that this medicine operates on the bile alone; for that the bile has a conſiderable ſhare in cauſing intermitting Fevers, I have not the leaſt doubt.

However, it ſometimes happens, that this febrifuge fails in true intermittents; which failure is generally owing to a bad habit of body. Wherefore the phyſician ſhould uſe his beſt endeavours to diſcover in what part the fault lies; and it will be commonly found to be in the viſcera and glands of the abdomen. Upon this account it will be neceſſary to preſcribe ſome purges, and ſometimes vomits; and in the intermediate days deobſtruents and ſtomachicks, the beſt of which are aromatick bitters and preparations of ſteel. And for the ſame reaſon it is, that quartans are of more difficult cure than any other intermittents: for in theſe the blood and humours are inert and exceſſively viſcid; ſo that there are two diſeaſes to be conquered together, the bad habit of body, and the Fever: which is generally done effectually, by joining Virginia ſnake-root and ſteel with the bark. However, it may not be improper to take notice, that in ſome caſes where the bark did not anſwer, I have taken off intermitting Fevers with a powder compoſed of chamomile-flowers, myrrh, ſalt of wormwood, and a little alum.

But there is more danger attending that ſort of intermitting Fever, by the Greeks named ἡμιτριταῖος, that is, ſemitertian. This Fever returns every third day; and of forty-eight hours the fit commonly takes up about thirty-ſix, more or leſs; nor does the Fever go off entirely, but only remits between the paroxyſms.——Hence Galen was right in ſaying, that it was compounded of a continual quotidian and an intermitting tertian[p].

Thus a particular regard is due to this diſeaſe, which ſeems to be cauſed by an inflammation of ſome internal parts, accompanied with obſtructions from bilious humours and too viſcid lymph. Wherefore blood is to be drawn once or oftener, according to the patient's ſtrength: and gentle purgatives, ſuch as the diuretick ſalt, manna with Glauber's ſalt, and the like, are to be ordered and repeated at proper diſtances of time. Nor ought we to be haſty in giving the bark, for fear it ſhould encreaſe the inflammation by adding to the obſtruction of the viſcera, and bring on a hectick. It will be much ſafer, firſt, to order the ſaline draughts, with juice of lemons, ſalt of wormwood, and ſimple cinnamon-water, to be taken frequently.

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[p] De different. febr. lib. ii. cap. 7.

SECTION IX.

OF EPIDEMICK FEVERS.

Epidemick Fevers are cauſed by ſome fault in our ambient air; and that is chiefly owing to the exceſs of heat, cold, drought, or moiſture, or to the unreaſonable viciſſitudes of theſe qualities.

In Greece and Aſia, where the ſeaſons are generally uniform, and the winds pretty regular from certain but different quarters in the different months of the year, it was eaſy for men of ſagacity to obſerve the changes of the weather, with their good and bad effects. And on a long uſe of this method of obſervation, was built the art of prognoſtick in diſeaſes; wherein Hippocrates the father of phyſick firſt excelled.

But in our climates, ſuch is the inconſtancy of the weather, and ſo many are the cauſes that raiſe different and even contrary winds on a ſudden, that it ſeems impoſſible to erect any ſolid ſuperſtructure on that foundation. And accordingly Sydenham, who, in imitation of Hippocrates, attempted to deſcribe the Fevers of each reſpective year, and to account for their differences from the difference of the weather and ſeaſons, found at length "that he had made no progreſs in diſ-"covering the cauſes of epidemical diſeaſes by obſerving the "manifeſt qualities of the air: as having remarked that in "different years, which agreed perfectly well in the viſible "temperature of the air, the reigning diſeaſes were very dif-"ferent, and ſo on the contrary: and likewiſe that there are "various conſtitutions of years, which depend not on heat, "cold, drought, or moiſture, but on ſome occult and inex-"plicable alteration in the very bowels of the earth[q]."

Now, this matter, in my opinion at leaſt, ſtands thus: that the manifeſt qualities of the air have a conſiderable ſhare in producing epidemick diſeaſes, is a point that admits of no doubt; but there are other conjunct cauſes, which alter the force of thoſe qualities, either by encreaſing or diminiſhing them. Theſe chiefly ſpring from the earth, as Lucretius wiſely ſaid,

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[q] Obſ. med. cap. ii. De morbis epidemicis.

——ubi putrorem humida nacta eſt,
Intempeſtivis pluviiſque & ſolibus icta [r].

When ſhe's grown putrid by the rains, and ſweats
Such noxious vapours, preſs'd by ſcorching heats [s].

Now as this terreſtrial putridity is chiefly occaſioned by rotted vegetables, and ſometimes alſo by the dead bodies of animals, and by minerals; ſo the waters, eſpecially of lakes and moraſſes, which have their plants and animals, in the ſame manner frequently exhale peſtilential vapours, which infect the circumambient air. In this claſs may be ranged, though rarely happening in our climes, inundations, earth-quakes, eruptions from mountains, and all other remarkable and uncommon phænomena of nature, which are capable of filling the air we breathe, with particles offenſive to animal life. For theſe affect our bodies, and prepare them for the eaſy reception of diſeaſes.

SECTION X.

OF SLOW OR HECTICK FEVERS.

Slow Fevers, commonly called hectick, are owing to ſo many different cauſes, that they may well ſeem, not to be the ſame, but different diſeaſes. Of all this tribe the moſt pernicious are thoſe, which ariſe from an ulcer in any principal part of the body, the lungs eſpecially, by the purulent matter mixed with the blood, and diſturbing its natural motion.

Now it is to be obſerved, that the perſons moſt liable to theſe exulcerations of the lungs, are ſuch as had been afflicted with ſcrophulous diſorders in their infancy or youth. To which purpoſe I remember the experienced Dr. Radcliffe was wont to ſay, that pulmonary conſumptions in this and the colder countries are generally ſcrophulous. And indeed, in the diſſection of bodies, dead of conſumptions, we very often find the lungs beſet with tubercles or indurated glands, which had ſuppurated and thrown off purulent matter.

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[r] Lib. vi. v. 1099.

[s] Creech's Lucretius, B. vi. v. 1057.

Medical writers have accurately deſcribed the various ſtages of this diſeaſe, as they ſucceed each other; but they have not taken ſufficient notice, that ſome of its firſt cauſes have their periods or returns. And yet it is of great conſequence to obſerve and prevent theſe periodical returns, as much as poſſible. Thus we ſee ſeveral perſons at certain or ſtated times ſeized with a ſpitting of blood, or a defluxion of thin ſeroſities on the lungs, and ſometimes with bilious vomitings. In all theſe caſes the bark is of ſervice, if joined with pectorals, and given before the expected return of the diſorder: which rule holds equally good in other hæmorrhages. But, when the lungs are actually ulcerated, this ſame medicine is very prejudicial; as ſhall be taken notice of anon.

In ulcers of the lungs phyſicians particularly recommend a milk courſe, as having the double advantage of being food and phyſick. But this practice is liable to ſome caution; becauſe ſome people have a natural averſion to milk. Moreover, in head-achs, acute Fevers, and exceſſive thirſt occaſioned by them; and likewiſe in flatulencies, in bilious looſeneſſes, and very bloody ſtools, milk ought always to be deemed a poiſon [t]. Now, we generally give the preference to aſſes milk, though leſs nutritive; becauſe it is more cooling and detergent. But when it cannot be conveniently had, whey, made of cows milk, or even of goats milk, may be ſubſtituted in its room, eſpecially if the goats have been fed on fragrant herbs: but cows milk itſelf, although diluted, as uſual, with barley-water, is very frequently inconvenient. And the whey may be rendered more ſuitable to the diſeaſe by infuſing ſtomachick and carminative herbs in it. But it happens unluckily ſometimes, that when milk is extremely neceſſary for the body, ſuch is the laxity of the inteſtines, that they cannot bear it. In this caſe, the milk may be medicated in this manner: take of red roſes dried, of balauſtins, pomegranate rind and cinnamon, each one drachm; boil them in a pint of cow's milk. When the decoction begins to boil, pour a little cold water into it, to make it ſubſide: repeat this proceſs ſeveral times, till you have uſed a pint of water, and till the milk and water together are reduced to a pint. Then ſtrain off the liquor, ſweeten it with ſugar, divide it into convenient draughts, ſo that the patient may take the whole quantity every day. This diet will anſwer the double intention of affording nourishment, and reſtraining the looſeneſs; without putting the leaſt obſtacle to the uſe of other food or medicines.

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[t] Hippocr. Aphor. Sect. v. 64.

Now, it is of the utmoſt conſequence to attempt the cure of this dreadful diſeaſe early; and as it ariſes from inflammation, it requires not only one, but ſeveral bleedings. If the blood be thick and black, or ſizy, it is called bad blood, and is thought to indicate further bleeding; but if it be red and florid, it is eſteemed good, and the lancet is no more uſed. But this notion is apt to lead into miſtakes: for it is not uncommon to ſee blood drawn, when in the higheſt efferveſcence, extremely florid, and at the ſame time thick and ſizy: in which caſe, bleeding ought to be repeated till its redneſs and ſizyneſs are diminiſhed; which may be done without danger. It will poſſibly be thought a raſh practice to draw blood, even when the patient is much waſted in his fleſh, and very weak. But it is better to try a doubtful remedy than none: and a temporary leſſening of the ſtrength is of ſervice, when attended with a removal of part of the cauſe, which would weaken the body more and more every day. Wherefore, if the lungs be ulcerated, and the Fever run high, it will be proper to take away as much blood as the patient can bear, at proper intervals, ſo as to allow the body time to recruit. I have ſeen caſes, judged almoſt deſperate, where this method of practice ſucceeded well: but if it happen otherwiſe, the phyſician is not to be branded with the death of the patient, whoſe viſcera were ſo corrupted, that it was impoſſible to ſave him.

Before I quit this article, I muſt obſerve, that fumigations with balſamicks, ſuch as frankincenſe, ſtorax, amber, and benzoin, in order to correct and ſweeten the acrid and ſalt humours, is of vaſt ſervice in ſome caſes: which is to be done by throwing the ingredients on red coals, and receiving the fumes through a proper tube directly into the windpipe and lungs[u]. I am very ſenſible, that this method of adminiſtering balſamicks is almoſt entirely neglected, as uſeleſs. But whoſoever conſiders the length of the way, which they muſt make by the blood-veſſels, before they reach the lungs, and what a ſmall part of them comes to the place of their deſtination, will eaſily ſee, that this is the beſt way of communicating their virtue, if they have any.

For the ſame reaſon, I have known the ſmoke of balſam of Tolu, ſucked into the lungs through a proper tube, as we ſmoke tobacco, to be of ſignal benefit, eſpecially in ſpitting of blood.

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[u] See Chriſtophori Benedicti tabidorum theatrum, ſub finem. Lond. 1656.

To theſe little ſuppurations it may not be improper to ſubjoin a larger abſceſs, which is ſometimes formed in the ſame part, and is named a vomica. This diſeaſe, though bad in itſelf, and often terminates in a conſumption; yet is not attended with ſo much danger, as thoſe leſſer exulcerations. For I have ſeen caſes, wherein the patients, in a fit of coughing, threw up a pint or two of purulent matter of ſuch an exceſſive ſtench, that people could not bear the room, mixed with blood; and yet they were perfectly cured by a milk-diet and balſamicks, with anodynes properly interſperſed.

Thus far of the phthiſis, or pulmonary conſumption.

But there are two other ſpecies of conſumption, which waſte a perſon different ways. In one the body is not nouriſhed; and as ſome particles are always naturally flying off, and nothing coming to ſupply their place, an exceſſive waſting of fleſh enſues, which is called an atrophy. This is very frequently owing to a defect in the nervous fluid; and is either accompanied with a cachexy, which is the other ſpecies, or gradually brings it on. In both ſpecies, the food is corrupted by reaſon of the bad habit of body, and the parts are not recruited: and therefore a well regulated courſe of living, and ſteel-medicines to ſtrengthen the ſtomach, with laxatives at proper diſtances, are particularly indicated.

Laſtly, in all decays exerciſe and frictions, according to the patient's ſtrength, ought to be conſtantly uſed: change of air is generally of ſervice, and ſometimes a long ſea-voyage. Patients labouring under diſorders of the lungs, in this country, are very juſtly, ſent to Liſbon or Naples. But riding on horſeback, if practicable; if not, in a coach, or a litter at leaſt; or ſome other manner of moving the body, is always proper.

CHAP. II.

Of the diſeaſes of the head.

SECTION I.

THE APOPLEXY.

MOST diſeaſes of the head have a great affinity with each other, and commonly proceed from repletion. Of theſe the principal is the Apoplexy, which is ſometimes owing to an over viſcid blood, circulating too ſlowly, and almoſt ſtagnating in the arteries of the head: and this viſcid blood, being perpetually urged forward by the force of the heart, burſts its veſſels; and lodging on the brain, and compreſſing the nerves ſubſervient to the motions of the body, obſtructs their ducts, and prevents the influx of their native juice. But it is more frequently cauſed, without any conſiderable rupture of the veſſels, by a watery and red humour tranſuding from the blood, or by the juice, ouzing out of the circumjacent glands, which loads the membranes of the brain, fills its ventricles, and ſtops the courſe of the animal ſpirits. The former of theſe may be called the ſanguineous Apoplexy, the latter the pituitoſe. To that Hippocrates gives the epithet of ſtrong, and pronounces it incurable; and to this, he gives that of light or weak, and yet ſays it is difficult to be cured [a]. A great number of hiſtories of both ſorts may be read in Wepfer [b]: and Bellini has moſt rationally accounted for all the ſymptoms, in this, and the like diſtempers [c].

I ſhall not dwell on external cauſes, ſuch as blows, falls, and fractures of the ſkull occaſioned by them; becauſe they indicate no peculiar treatment, but what depends on ſurgery.

The ſanguineous kind requires plentiful and frequent bleeding, both from the arm and jugular veins; but purging is more requiſite in the pituitoſe. Opening the occipital veins, propoſed by Morgagni [d], is likewiſe of conſiderable benefit, as I have experienced in ſeveral very dangerous caſes. For as theſe veins have a communication within the brain with both the lateral ſinuſes; by opening theſe veins, part of the blood, which they would have conveyed into the ſinuſes, is take off; and the quantity of blood in the ſinuſes being thus ſomewhat diminiſhed, its motion through them is more eaſily performed. And therefore cupping in the nape and ſides of the neck, with pretty deep ſcarifications, to give a free paſſage to the blood, is always uſeful.

Upon the ſame account alſo it is, that drawing blood from the temporal arteries, which ſome authors recommend, is of ſervice, if it can be of any. As to the ſafety of this operation, Galen indeed aſſerts, that he ſaw an artery, even in the arm, opened without any great inconvenience [e]. But yet the quantity of blood, taken away by opening the temporal artery, is ſo inconſiderable, that much benefit cannot be expected from that practice. Wherefore it would be better to follow the advice, which Aretæus gives in an inveterate head ach, of opening the two arteries behind the ears[f]; becauſe they will diſcharge more blood, that would have run into the head, than the temporal arteries can.

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[a] Aphor. Sect. ii. 42.

[b] Obſerv. anatom. ex cadaveribus eorum, quos ſuſtulit apoplexia Amſtel. 1731.

[c] De morbis capitis.

[d] Adverſar. anat. vi. animadv. 83.

[e] Method. medendi, Lib. v. cap. 7.

Bliſters are likewiſe to be laid on the head and all the limbs; and cathartics are neceſſary, taken both by the mouth, and by way of clyſter: but they muſt be acrid and powerfully ſtimulating; becauſe the nervous fibres are become very torpid.

The lethargy and carus are lighter ſpecies of the Apoplexy.

SECTION II.

THE PALSY.

The apoplexy, when it is not mortal, very frequently terminates in a Palſy, which is the criſis of the diſeaſe: and this Palſy generally ſeizes but one ſide of the body. And what the above-cited Morgagni obſerves after Valſalva, that on diſſection of the bodies of apoplecticks, who had been ſeized with a hemiphlegia, he always found the cauſe of the diſeaſe in the oppoſite ſide of the brain[g], I have formerly found true, more than once, in St. Thomas's hoſpital

There is now no longer any room for blood-letting, or draſtick purges; it will be ſufficient to give warm and moderate catharticks now and then, ſuch as the tinctura ſacra. And as the diſeaſe is now become chronical, inſtead of bliſters, it will be requiſite to make iſſues in proper places, eſpecially in the nape of the neck, and above the ſcapulæ, either with the actual cautery, or with cauſtick medicines. Hippocrates adviſes to apply the actual cautery in eight places at leaſt, and ſpecifies them[h].

The cure is to be chiefly proſecuted with aromatick ſtrengtheners and ſteel. And beſides, it is of ſervice to ſtimulate the ſkin of the paralytick part: which is extremely well affected by the green ointment, mixed with a ſeventh or eighth part of the ſtrong ſpirit of vitriol: and when the part begins to be rubefied, this liniment is to be removed, and the part anointed with ointment of elder. Cold-bathing is very beneficial in perſons not too far advanced in years; but hot-bathing is prejudicial to all paralyticks. And I have known ſome caſes of paralyticks, ſent to Bath by a miſtaken notion of their phyſicians, who, upon coming out of the bath, were ſeized with a return of the apoplexy, which caried them off.

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[f] De morb. diuturn. curat. Lib. i. cap. 2.

[g] Adverſar. anat. vi. animadv. 84.

[h] De Morbis, Lib. ii. Sect. 12.

Wherefore I take this occaſion to publiſh ſome remarks, which I have made on theſe waters. Their chief virtue ſeems to me to conſiſt in a certain mineral heat, whereby they warm and cheriſh the ſtomach and inteſtines; and therefore they are chiefly ſerviceable to thoſe, who have ruined their appetite and digeſtive faculty by drinking wine, or other ſpirituous liquors: which is well known to be the cauſe of a number of evils. But they are very prejudicial to all, whoſe inward parts, as the brain, lungs, liver or kidneys, are too hot. And for the ſame reaſon, though they may be agreeable to, and mend the ſtomach; yet if the uſe of them be continued too long, they more frequently hurt this organ; that very warmth, which was beneficial at firſt, by immoderate perſeverance becoming prejudicial, by over-relaxing the fibres. A circumſtance, which I have ſeveral times obſerved more particularly in patients, whoſe diſeaſes were owing to a fault in the nervous fluid.

This diſeaſe never is acute, is often tedious, and in old people almoſt incurable; and the patient for the moſt part drags a miſerable life. For the vigour of his mind together with his memory are loſt, or vaſtly impaired; he totters and ſhakes, and is become a diſmal ſight; as if no longer a man, but an animal half dead.

ST. VITUS'S DANCE.

This odd diſeaſe, both in ſymptoms and name, is of the paralytick kind, and is cured by frequent cold-bathing and chalybeate medicines, as I have already ſaid upon another occaſion[i].

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[i] Influence of the Sun and Moon, p. 197.

SECTION III.

THE EPILEPSY AND VERTIGO

Concerning the periodical returns and methods of cure of both theſe diſeaſes, I refer the reader to what was ſaid before [k], in which I treated of them pretty amply.

However, to what has been there ſaid, I think proper to add two admonitions. The firſt is, that the vertigo is very often more a diſeaſe of the ſtomach, than of the head; or at leaſt, that both theſe parts are affected together, from a quantity of bilious and viſcid humours lodging in the guts. When that is the caſe, no medicines will be effectual, without premiſing a vomit of Ipecacoanha wine, or ſome other proper emetick. And afterward, Mynſicht's elixir of vitriol, taken in ſpring-water an hour or two before and after dinner, will mend the appetite and digeſtion.

The other is, that the Peruvian bark, joined to ſome medicine appropriated to the diſeaſe, has frequently been of great ſervice, eſpecially if it be given thus:

> Take of Peruvian bark one ounce; of wild valerian root powdered two drachms; of ſyrup of orange-peel a ſufficient quantity; make an electuary.

Of this let the patient take a drachm, after the proper evacuations, morning and evening for three months together; and then repeat it three or four days before the new and full moon.

THE TETANUS.

This uncommon diſeaſe is a violent preternatural convulſion of the muſcles of the whole body: and therefore is to be treated with the ſame medicines as the epilepſy.

CHAP. III.

OF MADNESS.

THERE is no diſeaſe more to be dreaded than Madneſs. For what greater unhappineſs can befal a man, than to be deprived of his reaſon and underſtanding: to attack his fellow-creatures with fury like a wild beaſt; to be tied down, and even beat, to prevent his doing miſchief to himſelf or others: or, on the contrary, to be ſad and dejected, to be daily terrified with vain imaginations; to fancy hobgoblins haunting him; and after a life ſpent in continual anxiety, to be perſuaded that his death will be the commencement of eternal puniſhment? And to all theſe may be added this unhappy circumſtance, that the diſorder is very difficult to be cured. Now, in order to the clearer comprehenſion of what I have to ſay from experience on this diſeaſe, I will premiſe a few hints concerning its nature.

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[k] Influence of the Sun and Moon, p. 177, &c. 195, &c.

A very frequent cauſe of this evil is an exceſſive intention of the mind, and the thoughts long fixed on any one object, even though it be of the pleaſing kind. For ſuch intention of mind, ſuch fixed thought, is capable of perverting the rational faculties, as we ſometimes obſerve in ſtudious perſons; but when it is blended with ſome of the paſſions, as hope, fear, anger, &c. the diſorder is heightened; and the Madneſs is accompanied either with melancholy or fury, according to the nature of the cauſe, and chiefly according to the natural propenſity of mind in the patient to this or that paſſion. Now, nothing diſorders the mind ſo much as love and religion, I mean falſe and vain religion, or ſuperſtition. Love is attended with hope, fear, jealouſy, and ſometimes with wrath, and hatred ariſing from the latter. Superſtition fills and diſtracts the mind with vain terrors, and notions of divine vengeance. Hence, it happens, that the Madneſs of perſons in love is more generally of the maniacal, and that of ſuperſtitious people of the melancholick kind.

But theſe two diſorders ſometimes take each other's place, and undergo various degrees of combination.

In fine, Madneſs riſes to the greateſt heighth, when the mind is racked with contrary paſſions at the ſame time; as wrath and fear, joy and grief: which, by drawing it different ways, at length quite overpower it.

We all know the conſtitution of our fabrick to be ſuch, that whatever images preſent themſelves to the mind, whether of things that may be beneficial or prejudicial to us, they neceſſarily excite certain affections or paſſions in the ſoul, which are inſtantly followed by ſuitable motions in the body. Thus joy, grief, hope, fear, deſire, anger, even againſt our will, act upon, and cauſe alterations in the body, by raiſing commotions in the blood and humours. And it matters not, whether the ideas be true and real, or falſe and imaginary, provided the mind has been long intent upon them: nay we often find by experience, that the ſoul is more powerfully wrought on by imaginary than real evils. Thus the vain dread of impending poverty is ſo much more intolerable than the real affliction itſelf, as to drive timorous people to lay violent hands on themſelves. So far is the life of man expoſed to miſeries on every ſide!

Now the inſtrument of all theſe motions, both of the mind and body, is that extremely ſubtle fluid of the nerves, commonly called amimal ſpirits. Concerning the nature of which we have formerly[a] offered our conjectures, and have ſhewn, that this active fluid is very ſuſceptible of various alterations; a remarkable inſtance whereof we have in the very diſeaſe, of which we are now treating.

Medical writers diſtinguiſh two kinds of Madneſs, and deſcribe them both as a conſtant diſorder of the mind without any conſiderable fever; but with this difference, that the one is attended with audacioufneſs and fury, the other with ſadneſs and fear: and that they call mania, this melancholy. But theſe generally differ in degree only. For melancholy very frequently changes, ſooner or later, into maniacal Madneſs; and, when the fury is abated, the ſadneſs generally returns heavier than before: hence all maniacal people are fearful and cowardly; which is an obſervation of great uſe in practice. Now, that the animal ſpirits acquire various preternatural properties, as I have already ſaid, in all Madneſs, is eaſily demonſtrated. But a ſurprizing circumſtance in this diſtemper is, that it not only often preſerves the patient from other diſeaſes, but when it ſeizes him actually labouring under them, it lays ſuch ſtrong claim to the whole man, that it ſometimes diſpoſſeſſes the body of them. And this happens, not only in ſlight ailments, but alſo in great and dangerous illneſſes; ſo that we may ſay with the poet,

Aliquiſque malo fuit uſus in illo.

Some benefit reſulted from that evil.

I remember to have ſeen two remarkable inſtances of the truth of this obſervation. One was the caſe of a young lady, about twenty years of age, of a lively chearful temper, but weakly conſtitution; who from a bad habit of body fell into a dropſy of the abdomen, with great waſting of fleſh. After trying all methods of cure to no purpoſe, when ſhe was paſt all hopes of recovery, ſhe was on a ſudden ſeized with Madneſs (from what cauſe I know not) attended with great anxiety and vain terrors of mind: for ſhe imagined that ſhe was to be apprehended, tried, condemned, and executed for high treaſon. In the mean time ſhe gathered ſtrength, and the ſwelling of her belly ſubſided viſibly: ſo that in a ſhort time, I judged her able to bear more powerful medicines adapted to her two diſeaſes. Accordingly ſhe was put into a courſe of emeticks, cathartricks, diureticks, and ſtomachicks; which had ſo good an effect, that in ſome months ſhe recovered perfect health of mind and body.

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[a] See Introduction to the eſſays on Poiſons, edit. 3.

The other, ſomewhat different from the foregoing, was alſo the caſe of a beautiful young lady, who was, in the twenty-eighth year of her age, ſeized with a violent cough, and ſpitting of blood. For which ſhe was blooded plentifully in the arm, every other day, five or ſix times. This diminiſhed the violence of the ſymptoms, but did not entirely remove them: and in two months a hectick came on, attended with thirſt, heat, and night-ſweats; together with great waſting of fleſh, and frequent ſpitting of tough ſlime, from the lungs and throat, interſperſed here and there with ſmall portions of yellow purulent matter. Now ſhe was running into a true pulmonary conſumption, and death ſeemed to be at the door. Whereupon the patient began to be anxious for the ſalvation of her ſoul. She was immediately viſited by her ſpiritual guides: who, inſtead of quieting her conſcience, and raiſing her hopes, ſtrongly inculcated, that the way to heaven was rugged and difficult, and not to be paſſed without faſting, prayer, and anguiſh of mind: as if the happineſs of the life to come was not to be purchaſed but by the unhappineſs and miſeries of this life. But obſerve the event. The miſerable young lady, overpowered by ſacred terrors, was ſoon ſeized with religious Madneſs. Night and day ſhe ſaw the appearance of devils, ſulphureous flames, and other horrid images of everlaſting tortures of the damned. But from this time the ſymptoms of the original diſeaſe began to abate: the febrile heat decreaſed, the ſpitting ſtopped, the ſweats grew leſs; and her whole habit was ſo much changed for the better, that the bodily ſtrength ſeemed to become more adequate to performing the functions of life, in proportion as the mind grew leſs capable of governing the body. But in a few days ſhe grew quite melancholick. Wherefore the diſeaſe was treated by evacuations, proportioned to her ſtrength, and other proper medicines; which ſeemingly had ſo good an effect, that there appeared ſome hopes of a perfect cure. But alas! toward the end of the third month, the hectick and ulceration of the lungs returning, this charming virgin died conſumptive, who ſeemed worthy of a better fate.

This diſeaſe then entirely conſiſts in the ſtrength of imagination. For pleaſing or terrifying images are repreſented to the mind; and theſe, in the ordinary courſe of nature, are neceſſarily followed by ſuitable, and as it were coherent motions of the body. Hence even brutes ſometimes run mad, that is, are deprived of their reaſon: for (whatever ſome hair-brained philoſophers ſay to the contrary) they have a ſhare of reaſon proportionate to their reſpective natures.

Daily experience convinces us of the vaſt power of this faculty. For what is more wonderful, than that a man ſhould perſuade himſelf that he is changed into a dog, or a wolf; that he is actually dead, and converſing with the dead, while he is full of life and ſtrength; that he wears a head of glaſs or clay; and a hundred other ſuch extravagant fancies, of which mad folks are ſometimes poſſeſſed. And yet what often happens to pregnant women, ſeems ſtill more aſtoniſhing, nay almoſt incredible. For it is well known, that when they are ſeized with violent longings, it is not uncommon to ſee the child marked with the fruits, or other things, for which they longed; and theſe marks ſometimes laſt as long as life. However ſurpriſing theſe things may be, they yet fall ſhort of the following fact related by Mallebranche, which comes nearly up to a prodigy [b]. "About ſeven or eight years ago "(ſays he) there was in the hoſpital of incurables (at Paris) a "young man, an ideot from his birth, whoſe body was broken "in the ſame places in which criminals are broken. He lived "near twenty years in that condition: many perſons ſaw him, "and the late queen-mother making a viſit to that hoſpital, "had the curioſity not only to ſee, but even to touch the "arms and legs of this youth, in the places where they were "broken." The cauſe of this unhappy accident was ſoon found to be, that the mother, while big with this child, was preſent at the execution of a malefactor, who was broke alive on a croſs with an iron bar. That ſhe was exceſſively terrified, it is eaſy to believe; but how the force of her imagination could produce ſuch an effect on the fœtus, is a matter of great difficulty. Mallebranche attempts to account for it, in his uſual manner, by ingenious conjectures, ſaying, that the imaginary faculty is a certain inward ſenſation, which is entirely performed by the aſſiſtance of the animal ſpirits: that the fœtus ought to be deemed a part of the mother's body, ſo that, whatever any part of the mother ſuffers, is by ſome occult communication tranſmitted to the ſame part in the fœtus. Wherefore, when the pregnant woman was ſhocked at that dreadful ſight, poſſibly ſhe ſuffered pain, and even ſome degree of laceration of the fibres, in the ſame limbs, which ſhe ſaw broken in the malefactor: but as her bones were firm and ſolid, they were capable of reſiſting the ſhock; whereas thoſe of the fœtus, being ſcarcely knit, were eaſily broken, ſo as never to unite again. But whether this reaſoning be juſt, or not, the fact is a manifeſt proof, that the imagination has a wonderful degree of power to affect the body.

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[b] Recherche de la verité. Tome I. liv. ii. chap. 7.

Another remarkable circumſtance is, that immoderate joy, too long continued, as effectually diſorders the mind as anxiety and grief. And the reaſon ſeems to be, that the pleaſing images, which are conſtantly preſent to the mind, ſuffer it not to attend to other things: and as it is ſtruck and interrupted a thouſand ways by objects, which neceſſarily occur every day; hence conflicts ariſe, which give a wrong turn to, and at length deſtroy, the thinking faculty. To which may be added the notions of ſolicitude and fear, leſt ſome unforeſeen ſtroke of adverſe fortune ſhould overturn this happy ſtate. I have formerly heard Dr. Hale, phyſician to Bethlehem-hoſpital, and of great experience in theſe matters, ſay more than once, that in the year 1720, ever memorable for the iniquitous South-ſea ſcheme, he had more patients committed to his care, whoſe heads were turned by the immenſe riches which fortune had ſuddenly thrown in their way, than of thoſe who had been completely ruined by that abominable bubble. Such is the force of inſatiable avarice in deſtroying the rational faculties!

But it is ſtill more to be wondered at, that mad-folks, eſpecially of the melancholick tribe, ſometimes take it ſtrongly into their heads, to do things which give the greateſt pain and uneaſineſs to the body; than which nothing is more contrary to human nature. For, though periſhing with hunger, they obſtinately refuſe, and even abhor food, as if it were poiſon; and retain their urine for whole days together, though ready to burſt. In caſes of this kind, the mind ſeems in ſome meaſure to be called away from the ſenſes, while it is impoſſible but that the pain muſt be felt: but the unhappy perſon obſtinately refuſes to give attention to what is tranſacted within his body. And it is not improbable, that he is poſſeſſed with ſome vain notions, which make him patiently bear the pain he ſuffers: for example, that, if he does not, he will have more ſevere tortures inflicted on him; that the preſent pain was ſent down from heaven on him in puniſhment for his ſins, or is the effect of the devil's inevitable power, or of witchcraft, and many other ſuch empty notions. For there is nothing, how incredibly ſilly ſoever, and contrary to good ſenſe, but may affect a depraved imagination.

But, to come at length to the cure, the phyſician's firſt care ought to be to conſider, what evacuations the patient is able to bear; becauſe evacuations of almoſt all kinds are generally neceſſary, if his ſtrength will allow them: if not, he is to be ſtrengthened by proper diet and medicines, till ſuch time as he can ſafely bear evacuants. For, when the humours have been too much drained, it is not uncommon to ſee maniacal Madneſs ſucceeded by an incurable dejection of mind and melancholy; under which the miſerable patient drags a tedious life in perpetual anxieties and ſadneſs: and mad-men for the moſt part live very long. Now the proper evacuations in this diſeaſe are chiefly blood-letting, vomits, and purging by ſtool and urine: wherefore I ſhall offer a few remarks on each of theſe heads.

Blood is moſt commodiouſly drawn either from the arm or the jugulars; and ſometimes alſo by cupping with ſcarifications in the occiput; particularly in caſe of a head-ach, or of ſuch a degree of weakneſs as forbids the farther uſe of the lancet.

Vomiting is beſt excited with Ipecacoanha wine in the more weakly; but in the more robuſt with the tincture of white hellebore, or antimonial wine.

The propereſt catharticks are black hellebore, or infuſion of ſena with tincture of jalap; or aloes in fine, if the ſuppreſſion of the monthly evacuations in women, or of the hemorrhoids in men, requires diſcharges in blood by theſe natural ways. And theſe evacuations, both by vomit and ſtool, are to be often repeated, in alternate order. Nor does it ſeem improper to add, that this diſeaſe demands powerful medicines; becauſe in it the nerves are not eaſily ſtimulated.

But evacuation by the urinary organs is of greater moment than is commonly thought, eſpecially when Madneſs is accompanied with a fever. For it is of little benefit to melancholicks, who for the moſt part make too much urine. And the moſt appoſite diureticks in this caſe are the lixivial ſalts of vegetables and the diuretick ſalt ſo called: any of which, or both ſorts, may be given by turns, in pretty large doſes.

Bliſtering plaiſters applied to the head will poſſibly be thought to deſerve a place among the remedies of this diſeaſe; but I have often found them to do more harm than good by their over-great irritation. It will be better, in imitation of the ancients, to ſhave the head; and then to rub it often with vinegar, in which roſe-flowers or ground-ivy leaves have been infuſed: and alſo to make a drain, by paſſing a ſeton in the nape of the neck; which is to be rubbed with a proper digeſtive ointment, and moved a little every day, in order to give a free iſſue to the purulent matter. However, when the diſeaſe is of long ſtanding, bliſters are ſometimes ſerviceable.

While the noxious humours are expelled by theſe means, the diſeaſe is likewiſe to be attacked by thoſe medicines, which effect a change in the body. The diet ought to be ſlender, chiefly gruel made of oatmeal or barley, and meats of eaſy digeſtion. For the body muſt be nouriſhed, that the patient may have ſtrength enough to bear the neceſſary evacuations.

Authors, both ancient and modern, recommend a great number of medicines; ſome of which are ſuitable to maniacal, others to melancholick patients: but both ſorts agree in the property of correcting the bile; which is acrid at firſt, then becomes viſcid, and black as pitch. Moreover, the very blood in this diſorder is thick, ſizy, and black: whence upon diſſection the brain appears dry, and almoſt friable, and the veſſels diſtended with black, ſluggiſh blood. Now it will be of uſe to obſerve, that moſt of the medicines, proper to be given in this diſeaſe, are in ſome degree endued with the property of opening and ſcouring the glands, and encreaſing perſpiration. Of this kind are the ſtrong-ſmelling gums, eſpecially aſa fœtida, myrrh, Ruſſian caſtor, and camphire: which laſt is aſſerted by ſome authors of experience, to have likewiſe an anodyne quality, and to procure ſleep with greater certainty and ſafety even than opium. And in melancholick caſes, chalybeates are alſo very proper. In fine, a frequent uſe of the cold-bath is very ſerviceable, eſpecially in maniacal caſes. For nothing, as Celſus ſays, is of ſuch benefit to the head, as cold water[e].

It now remains to lay down ſome rules for the management of mad-folks, than which nothing conduces more to their cure: and different methods are to be employed with the maniacal and melancholick. The unrulineſs of thoſe is to be curbed; and the deſpondency of theſe to be diſſipated by giving them hopes, and raiſing their ſpirits. And yet with regard to thoſe who are outragious, it is not neceſſary to employ ſtripes, or other rough treatment, to bring them into order; binding alone being ſufficient for that purpoſe: becauſe, as I have already ſaid, they are all cowards; and when they are once ſenſible of being thoroughly conquered, they eaſily ſubmit for the future, and dare not offer violence to themſelves or others.

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[e] Lib. i. cap. 6.

It is a more difficult matter to manage thoſe, whoſe Madneſs is accompanied with exceſſive ſadneſs or joy; to whoſe different humours the phyſician ought to accommodate himſelf. Wherefore the ill-timed fits of laughter of ſome are to be ſtopped by chiding and threatening; and the gloomy thoughts of others are to be diſſipated: to which concerts of muſick, and ſuch diverſions, as they formerly took delight in, are very conducive. And how muſick affects and relieves both the body and the mind, I have formerly publiſhed my thoughts [d].

But it ought to be a ſtanding rule, to inculcate notions directly contrary to thoſe, with which they were long poſſeſſed; in order to inure the mind by degrees to a new way of thinking. For as in the caſe of a body, broken with ſickneſs or fatigues, reſt and intermiſſion of labour are proper to be ordered; ſo it is requiſite, by all practicable means, to draw off the mind from thoſe vain fancies, which it has imbibed. And this we ſhall compaſs, if we turn it upon objects, which excite different motions in it. Thus in imaginary fears of long duration, it is ſometimes beneficial to affright the patient with real dangers. But theſe real terrors muſt in their own nature be quite unlike their falſe or imaginary ones, in order to cauſe a different agitation in the mind. For the mind cannot be abſolutely at reſt, though it may be free from care and anxiety: and a change of ideas may be deemed a recreation and relaxation from ſtudies: juſt as the muſcles of the limbs, when tired with any one ſort of labour, are refreſhed by putting them on different actions.

Bodily exerciſe is never to be neglected. Walking, riding, playing at ball, bowls, and other ſuch ſports; ſwimming, and travelling by land and ſea, are of great uſe: for by theſe the conſtitution of body is ſtrengthened, and the mind reſumes its rational faculties by the conſtant exchange of objects.

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[d] Mechanical account of Poiſons, Eſſay iii. See alſo what Aretæus ſays on this head: De curat. acutor. Lib. i.

To what has been hitherto ſaid, I ſhall ſubjoin one animadverſion more: that anodynes to procure ſleep are very ſeldom proper in this diſeaſe. But yet in ſome caſes, as in great terrors of mind, or when the patient, through ſolicitude and ſadneſs, is much fatigued with conſtant watching, it may not be amiſs to make trial of them; but we are not to perſiſt long in their uſe: for it often happens, even when they procure ſleep, that when the patient awakes, his head is filled with more terrifying ideas than before.

I cloſe this chapter with obſerving, that there is no diſeaſe, in which the danger of a relapſe is greater: wherefore every thing that has been hitherto propoſed for the cure, whether relating to medicines, diet, or manner of living, ought to be repeated for a conſiderable time at due intervals, even after the patient has recovered.

CHAP. IV.

Of the QUINSY.

MEDICAL authors have carefully treated of ſeveral ſorts of Quinſies; but there are three ſorts the moſt acute and fatal of all, the nature of which they have not explained with ſufficient accuracy. Of theſe the firſt may be called the watery Quinſy, the ſecond a gangrene of the tonſils, and the third a ſtrangulation of the fauces.

In the firſt ſort, the glands of the mouth, palate, and neighbouring parts are diſtended and ſwoln. In the ſecond, an inflammation without a perfect ſuppuration ſeizes the tonſils; which ſwell and grow hard; a gangrene ſoon enſues, which, if not very ſpeedily relieved, is fatal. In the third, all the nerves are convulſed, and the patient drops down dead ſuddenly. Of this third ſort I have ſeen one inſtance, in which though a large quantity of blood was drawn twice in ſix hours time, yet that evacuation was of no avail. Upon diſſection there was not even the leaſt appearance of ſwelling or inflammation in the glands or muſcles of the mouth and throat; but the blood-veſſels were turgid every-where with a thick blood. This diſeaſe, however rare, is deſcribed by Hippocrates. "Of Quinſies, ſays he, thoſe are the worſt, and "ſooneſt fatal, which ſhew nothing remarkable either in the "fauces or neck; and yet bring on very much pain and dif-

" ficulty of breathing [a]." Theſe ſorts are all very dangerous, and require ſome difference in the treatment.

I remember, that the watery Quinſy reigned ſome years ago like an epidemick fever in Wales, eſpecially in places near the ſea, and carried off a great number of people in two or three days from their ſeizure. Whereupon, being conſulted by a phyſician reſiding there, I wrote him this advice; to bleed plentifully as ſoon as poſſible, and empty the firſt paſſages by a clyſter, or, if practicable, by a gentle purge; and then to apply bliſters under the chin, and on the ſides of the neck: and if this courſe did not ſucceed, to ſcarify the palate pretty deeply about the uvula and ſublingual veins; in order to give vent to the matter of the diſeaſe. In the mean time, to carry off the fever, I recommended a powder made up of equal parts of the compound powder of contrayerva, and very pure nitre. And this method ſaved very many lives.

In the gangrene of the tonſils, after bleeding and clyſters, the only remedy is, to make three or four pretty deep inciſions in theſe glands, which are to be dreſſed with honey of roſes, mixed with a ſmall quantity of Egyptian honey: and at the ſame time, the mouth and throat are to be gargled with a decoction of barley and figs. But it is to be obſerved, that all this is to be done in the beginning of the diſeaſe: for in two or three days the gangrene ſpreads to the gullet, and is mortal. I have ſeen ſome patients ſaved by this method, and others die, in whoſe caſes it was either neglected, or applied too late: while the attending phyſicians were of opinion, becauſe the fever ſeemed abated, that all was ſafe, and the patient out of danger; whereas, they ought to have conſidered, that his fluttering pulſe, great inquietude, and cold ſweats ſucceeding each other, were forerunners of ſpeedy death.

This diſeaſe chiefly ſeizes children; and Aretæus [b] has, in his uſual manner given an accurate deſcription of it; which Severinus [c] has illuſtrated with a learned comment, calling it the peſtilential Quinſy of children, and commending the method of cure above deſcribed; as the Latin Hippocrates [d] had done long before him.

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[a] Prognoſtick.

[b] De cauſis & ſignis morborum acutorum, Lib. i. cap. 9.

[c] Diatriba de peſtilente ac præfocante pueros abſceſſu, annexed to his book, De recondita abſceſſuum natura. Francfort, 1643.

[d] Celſus, Lib. vi. cap. 10.

The ſtrangulation of the fauces, which I have called the third pernicious ſpecies of Quinſies, if it can be foreſeen, ought to be prevented by evacuations of all kinds; I mean, by bleeding, purging, bliſtering, iſſues, and diureticks. And it will be of ſervice to practiſe abſtinence, that is, moderation in eating and drinking.

CHAP. V.

Of the diſeaſes of the breaſt.

OF THE ASTHMA.

DIFFICULTY of breathing ariſes from many and very different cauſes. For whatſoever occaſions the ambient air to enter the lungs with leſs freedom than uſual, brings on this diſeaſe. Now, for performing reſpiration, firſt the thorax muſt be dilated; which is effected by the actions of the diaphragm, and intercoſtal and abdominal muſcles. Next, the air muſt be received into the aſpera arteria; and therefore, whenſoever this duct or its ramifications are obſtructed, either by a tumour, or by viſcid humours, a difficulty of breathing muſt enſue. Then the air itſelf comes in for a partial cauſe; for if it be much heavier or lighter than uſual, it does not diſtend the veſicles of the lungs with ſufficient force. Likewiſe the tenderneſs of the very lungs ſometimes occaſions this diſtemper. For I have known ſome perſons, who breathed well enough in the thick air of the town; but upon going into the country, the clear air, which is beneficial to moſt aſthmatick patients, threw them into a very great difficulty of breath. In fine, the difficult paſſage of the blood through the lungs may be reckoned among the impediments of reſpiration. Now it is manifeſt, that this may happen ſeveral ways; that is, through ſome defect in the heart, or in the blood itſelf. When the heart is weak, it does not ſufficiently drive the blood forward; and if the blood chance to be too thick, it is not ſo eaſily moved; and in ſome meaſure ſtagnating in its veſſels, diſturbs and retards the office of the air. We could enumerate ſeveral other cauſes of this diſeaſe, but theſe are principal ones; and they are more or leſs fatal, according to their greater or leſſer combinations.

As this diſtemper is owing to different cauſes, ſo it requires different methods of cure. However, in every ſpecies of it, blood-letting is uſeful, unleſs there be ſome particular contra-indication. But that alone will not ſuffice: vomits too, and thoſe often repeated, are very proper, if the lungs or ſtomach be loaded with tough phlegm. The body muſt be kept open, but by no means with violent cathartícks: for the moſt part pills, made up of equal parts of Rufus's pills and gum-ammoniack, and given every night, will anſwer that end. The patient is to be forbid the uſe of all flatulent food and drink; and to be ordered to uſe exerciſe till he is almoſt tired, and frictions, of the lower parts eſpecially, both by himſelf and others, till he is pretty near ſweating.

In the fits, the breath is to be eaſed as much as poſſible. In the caſe of viſcid and tough humours, this is effected by a mixture of oxymel of ſquills and ſimple cinnamon water; or garlick either raw or preſerved. But if the fault lie in the nervous juice, all the ſtrong ſmelling gums are proper, eſpecially the milk of gum ammmoniack. But it ought to be remembered, that anodynes, which are poiſons in the preceding caſe, are very ſerviceable in this, if joined with volatile ſalts or ſpirits: but of all this tribe, I know no better medicine than the paregorick elixir.

Now, as ſome conſtitutions, through ſome defect of the ſolids or fluids, are apt to relapſe into this diſeaſe upon every occaſion; it is proper to give directions how to prevent it. Wherefore regard is to be had here, both to the conſtitution of the patient, and the nature of the diſeaſe. If he be of a hot conſtitution, coolers and acids, of the milder ſort, are indicated; the beſt of which are vinegar and the oxymels: but if it be cold, ſome warm medicines are ſerviceable; ſuch as the roots of elecampane and zedoary, ſagapenum, myrrh, and the like. In both caſes it is proper to give a vomit now and then; and to keep the body open with gentle cathartícks, as Glauber's ſalt. Water with a little wine is the moſt convenient drink.

But whereas every kind of this diſeaſe is attended with more or leſs of efferveſcence in the blood, the beſt way to obviate this ſymptom is to give the bark, eſpecially about the uſual time of the return of the paroxyſm. And I have known ſome inſtances, where it has done vaſt ſervice, mixed with cinnabar of antimony.

Laſtly, I muſt not omit, that iſſues above the ſhoulder-blades are good in all aſthmatick caſes; and it is very probable, that their benefit in this and ſome other diſtempers lies, not only in giving vent to the humours, but likewiſe in leſſening the over-great tenſion of the nerves.

Yet all theſe things are to be managed with caution. From the too frequent uſe of blood-letting a dropſy is to be apprehended. Drinking too much water is hurtful to old folks. Violent exerciſe cauſes ſhortneſs of breath; and ſo does the over-free uſe of acids by conſtringing the nervous fibres. So neceſſary is moderation even in medicine!

But for this, and other diſeaſes in the breaſt, I refer the reader to Bellini, De morbis capitis, pectoris, &c.

CHAP. VI.

Of the diſeaſes of the heart.

AS the heart, the primary inſtrument of all animal motions, and in ſome meaſure the fountain of life, is a muſcle, or rather a collection of ſeveral muſcles, it is liable to the ſame indiſpoſitions with the other muſcles of the body.

But the diſorder, with which it is moſt frequently ſeized, is a palpitation, whereby its motion is interrupted for ſome little ſpace of time. This proceeds from very different cauſes. For ſometimes its fibres becoming paralytick do not drive the blood with ſufficient force. At other times a polypus, formed in its ventricles or auricles, obſtructs its action. Again, when the blood is too thick, and too much in quantity, it is with difficulty thrown into the blood-veſſels. Likewiſe the motion of this muſcle may be impeded by an over-great quantity of water in the pericardium; though this indeed be a rare caſe. Stony concretions alſo put it out of order. And it ſometimes happens, eſpecially in aged perſons, that the tendons in the orifices of the ducts have acquired the hardneſs of bone; whereby their elaſticity is deſtroyed, and too great a reſiſtance is made againſt the propulſive motion. Nor is it to be omitted, that the want of a proper quantity of blood may occaſion this diſeaſe. For when this is the caſe, the animal ſpirits are ſecreted too ſparingly in the brain: whence the contraction of the heart is hindered, and there is an intermiſſion in the pulſe.

But it is to be obſerved, that this diſeaſe is generally a convulſion; and as in this ſtate, the heart is not able to throw out a due quantity of blood at one contraction, it repeats its effort: a remarkable inſtance of what I ſaid in the Introduction, that even thoſe motions, which are called involuntary, are governed and altered by our mind.

And let me add, by way of prognoſtick, that this diſorder, when it riſes to a high degree, and frequently returns, generally ends in a ſyncope, or fatal weakneſs, which authors believe to be another diſeaſe of the heart.

Now the method of cure is to be varied according to the nature of each of theſe various caſes. But this may hold good in general, that unleſs the patient be very weak, blood may be drawn; whereby the heart may be eaſed of part of the load of blood, which it is too feeble to throw into the arteries. And indeed, I have often obſerved, that not only the palpitation of the heart, but even a ſyncope, ariſes from fulneſs: and thus this ſudden fainting frequently ſucceeds the ſuppreſſion of any cuſtomary diſcharge of blood, for example, from the noſe or hemorrhoidal veſſels: whence it follows, that blood-letting muſt be very ſerviceable for preventing this evil; but it will hardly bear any other evacuations. The paralytick weakneſs of the fibres requires the medicines directed in the chapter of the Palſey. Thick blood, which engenders a polypus, is corrected by attenuating medicines, as volatile ſalts and fœtid gums. And bliſters are very proper to ſtimulate and rouſe the patient, eſpecially in caſe of fainting attended with ſleepineſs.

CHAP. VII.

Of the diſeaſes of the ſtomach and inteſtines.

ON the diſeaſes of the ſtomach and inteſtines, I have ſome things to propoſe, relating not only to what is to be done, but likewiſe to what is to be avoided. And firſt, although it be ſometimes extremely neceſſary to evacuate by vomit the viſcid phlegm, which loads the ſtomach; yet by too frequent vomits to invert that natural motion, by which the aliments are carried downward, is giving great diſturbance and impediment to the concoction of food.

Infuſions of the bitter herbs whet the appetite, and often help digeſtion: but there is reaſon to fear, that a long uſe of them may over-heat the muſcular fibres. Upon which account, it is frequently more convenient to brace them with ſome acids, eſpecially Mynſicht's elixir of vitriol; under this caution however, that they are not to be given, while the phlegm in the ſtomach is tough. For a very common diſorder of the ſtomach is relaxation; and that certainly requires the bracing of its fibres.

SECTION I.

OF A LOOSENESS.

A Looſeneſs is eaſily ſtopped. I ſpeak of that ſort, which is without a fever: for when it comes on a fever, we are to conſider, whether it may not prove a criſis of the diſeaſe. But when the caſe is a Looſeneſs alone, it will be generally ſufficient, after a vomit or two with Ipecacoanha wine, to purge with ſome doſes of rhubarb; and then to ſtrengthen the inteſtines with aromaticks and chalk, or French bole.

THE BLOODY FLUX.

But the caſe is attended with greater difficulty, when the looſeneſs is attended with a Bloody Flux, or ſevere gripes. For then the inteſtines are commonly ulcerated, and diſcharge blood; which comes away ſometimes with liquid excrements, ſometimes with ſlime, accompanied with fleſhy particles. The patient is ſeized with frequent irritations to ſtool, and a pain in the anus; he diſcharges but little at a time, and his pain is increaſed by every ſtool: and as this diſeaſe ariſes from an inflammation, there is always ſome degree of fever with it.

Wherefore, to come to the cure, the firſt thing to be done is to draw blood. Then a vomit is to be given, for which Ipecacoanha wine is very proper, and to be repeated two or three times more, every third or fourth day.

During this courſe, and afterward, medicines, proper for ſtopping the Flux and healing the ulcerated membranes, are to be adminiſtered. And of this ſort, I know none better than the following bolus, compoſed of the cordial confection and French bole, each one ſcruple, Thebaick extract one grain; given three times a day.

And it will be of ſervice to inject clyſters, either of fat broth with the addition of Venice treacle or electuary of ſcordium: or of the white decoction and ſtarch; or, in place of this laſt, of the chalk julep, with two or three grains of the Thebaick extract, when occaſion requires it.

Laſtly, I recommend as an uſeful remark, that this courſe is ſometimes rendered ineffectual by a bad habit of body. In ſuch caſes, to the foregoing method it will be proper to add medicines, which correct the humours; and indeed ſome doſes of rhubarb, with a ſmall proportion of dulcified mercury ſublimate, commonly called calomel, will prove very conducive to that end.

Beſides theſe diſeaſes, a vomica, or internal ſuppuration, is ſometimes formed in the ſtomach. This indeed ſeldom happens, but yet I have obſerved it more than once; when the patient vomited up a mixture of blood and purulent matter in large quantities. The caſe is terrifying indeed, but yet, generally ſpeaking, it is not attended with any great danger; and it is cured by medicines which heal the ulcered membranes, eſpecially by Locatelli's balſam.

SECTION II.

OF THE ILIACK PASSION.

This diſeaſe, by the Greeks named εἰλεὸν, and by Celſus[a] the diſeaſe of the ſmaller gut, is very acute. It is a violent inflammation of the inteſtine, which, unleſs ſpeedy relief be given, ſoon terminates in a gangrene, and death.

Wherefore blood muſt be plentifully drawn with great expedition, not once only, but twice, and generally thrice. Then the belly is to be moved. But this is very difficult to be done, becauſe acrid cathartioks cauſe too great an irritation, and are thrown up by vomit. Therefore it is to be attempted by ſtimulating clyſters and gentle catharticks; which are moſt likely to give mutual aſſiſtance to each others operation. Anodynes too are neceſſary, but mixt with the purging medicines. Thus a very proper medicine will be a ſcruple of the cathartick extract, with one grain of the Thebaick extract; and ſome hours after, two ſpoonfuls of infuſion of ſena, with the addition of a fourth part of the tincture of ſena, to be taken either every hour, or every two hours, until the patient has had a ſufficient number of ſtools.

If this courſe prove ineffectual, it will be right to order quick-ſilver to be ſwallowed down; which has a two-fold uſe in this caſe: to wit, by its ponderoſity, that of reſtoring the natural motion of the inteſtines, which is inverted; and by its ſlipperineſs, that of ſoftening aud driving downward the excrements which ſtop the paſſage. Upon theſe accounts it is to be given in large quantities, to a pound weight at leaſt; and generally requires to be repeated. Nor ought the phyſician to uſe any long delay in trying this experiment, for fear of an actual mortification of the inflamed parts; whereby the coats of the inteſtine would be deſtroyed, and the quickſilver run into the cavity of the abdomen.

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[a] Lib. iv. cap. 13.

In fine, fomentations are of ſome ſervice, particularly warm flannels ſoaked in ſpirit of wine; or, what Sydenham preſcribes, a live puppy held conſtantly on the bare belly [b]. But an immerſion up to the breaſt in the warm bath is far more beneficial. And if the pain is not yet diſcuſſed, it will be proper to apply cupping-glaſſes, with ſlight ſcarifications, about the navel.

The ſame method of cure is to be obſerved in that ſevere diſeaſe by the French called colica Pictonum, and by our people in the American iſlands, where it is very riſe, the dry belly-ach. For it is a pain, attended with a flame and inflammation, and a moſt troubleſome coſtiveneſs.

SECTION III.

OF WORMS.

The belly is frequently the ſeat of Worms; and they are of three ſorts, the round ſmooth ſort, the aſcarides, and the flat or jointed Worms: children are chiefly troubled with the firſt and ſecond; and adults with the third and worſt ſort. Theſe have been all treated of by many medical writers. But the learned Daniel Le Clerc has given the moſt accurate deſcription of the flat Worm, illuſtrated with figures [c]. And as he has refuted the erroneous opinions of ſome phyſicians concerning this creature, which ſeems to be an animal of a ſingular nature; I have borrowed from him the following remarks. Firſt it manifeſtly appears, that this is not a ſingle Worm, but a chain of many leſſer Worms, of that kind, which are called cucurbitinæ, linked together in a continued ſeries. Secondly theſe latter are ſometimes found, of a finger's breadth, lying ſingle and ſeparate in the inteſtines, and are ſo diſcharged by the anus. Laſtly, the whole Worm formed of the concatenation of theſe has but one head, which is pretty ſharp-pointed, ſomewhat reſembling a beak; which it fixes into the coats of the inteſtines, and ſticking there very faſt, ſucks the chyle for its nouriſhment.

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[b] See his works, Lond. 1705, p. 41.

[c] Hiſtoria naturalis & medica latorum lumbricorum, Genevæ, 1715.

To theſe obſervations of Le Clerc, I add ſome few from my own practice; for I have ſeen, and cured this diſeaſe more than once. And indeed, it is a truth equally ſtrange and diſagreeable, that though the medicines have deſtroyed and brought away ſeveral of the ſmall Worms, which are the component parts of the great one; yet others daily breed in the body, and join themſelves to the reſt, in order to repair the breach, until the head is expelled; and then at length the whole animal is diſcharged with it by the anus, and is frequently ſeveral feet long. But it is not at all ſurpriſing, that the ſharp beak above mentioned ſhould cauſe pain; and that the perſon, who entertains this devouring gueſt, and is under a neceſſity of ſupplying its daily food, ſhould waſte in his fleſh, and even run into a decay.

Wherefore theſe pernicious broods of Worms are to be deſtroyed by all poſſible means; and this is eaſily done with regard to the ſmooth round ſort, and the aſcarides. Quickſilver in every form is deſtructive of them; and therefore it will be very proper to order a purge of rhubarb, with a ſmall proportion of dulcified mercury-ſublimate, which is to be repeated at due intervals; and in the intermediate days to give æthiops-mineral morning and evening. Moreover, it will be of ſervice to drink ſpring-water, in which quick-ſilver has been boiled; and even ſea-water alone. In fine, oil injected by the anus does good.

But the flat Worm requires a peculiar treatment; and after many years experience, I recommend the following medicine as very efficacious in this caſe.

Take filings of tin, and red coral, of each an equal quantity; pound them together into a very fine powder; of which one drachm, made into a bolus with conſerve of the tops of ſea-wormwood, is to be taken twice a day.

In fine, the ſame medicines, which have deſtroyed and cleared the bowels of theſe inteſtine enemies, are to be repeated from time to time, to prevent their return.

There is another Worm, which deſerves to be taken notice of in this place, as being very different from thoſe above-deſcribed, both with regard to its ſeat, which is not in the inteſtines, but in the limbs, and to the oddneſs of its nature. I mean that, which the Arabians have named vena medinenſis, the Greeks δρακόντιον, and the Latins dracunculus. Avicen is the firſt author, who deſcribed this Worm, and to his deſcription he has ſubjoined the cure[d]. His Arabick text was rendered into Latin by Georgius Hieronymus Velſchius, and illuſtrated with an ample comment full of various erudition[e]. I ſhall give in few words the ſubſtance of what occurs in Avicen. He ſays, that this diſeaſe makes its firſt appearance by a pimple, which riſes on ſome of the limbs of the body, and in courſe of time ſwells into a bliſter: then it breaks, and there iſſues ſomewhat of a blackiſh red colour, which continues to come forth inceſſantly: ſometimes it has a vermicular motion under the ſkin, as if it were a real Worm. Galen calls this evil an ulcer, which has a nerve brought into it from ſome neighbouring part[f].

But, in truth, this diſeaſe, frequent in Æthiopia, Africa and India, is a real Worm. And in particular, it is an aquatick inſect, with a ſharp head and ſlender body, which works itſelf into ſome of the limbs, the legs eſpecially, of perſons, while they are bathing or otherwiſe remaining in water. It is then very ſmall; but by feeding on the membranes of the muſcles, it grows larger in all dimenſions; till at length, it gnaws the ſkin, and raiſes a ſwelling and inflammation, which ſuppurates; and then the creature puts forth its head, and is often found to be two or three feet long, and ſometimes longer.

The cure propoſed by Avicen, conſiſts both of internal medicines, and of external helps. For he adviſes the patient to take a drachm of aloes three days ſucceſſively. But if the Worm withſtands this medicine, and has actually begun to come forth; ſomething ſhould be provided, to which it may be faſtened, and on which it is to be rolled gently and gradually, that it may all come out without breaking. The beſt thing for this purpoſe, is a ſtick of lead, on which it is to be rolled; and it ought to be of a proper weight for pulling: then let it be drawn out gently for fear of breaking, &c. I have formerly ſeen in St. Thomas's hoſpital one inſtance of this caſe in a ſailor lately returned from Africa.

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[d] Lib. iv. Canon. ſect. iii. tract. ii. cap. 21 & 22.

[e] Publiſhed at Augſbourg, 1674. 4to.

[f] Definit. medic.

CHAP. VIII.

OF THE DROPSY.

THERE are three ſpecies of Dropſy mentioned by phyſicians both ancient and modern; the leucophlegmatia, or anaſarca, the tympany, and the aſcites. An exceſs of ſeroſities is common to them all; which being collected form a ſwelling; either all over the body, as in the leucophlegmatia; or in the belly, which is ſometimes ſo bloated, that a ſound is frequently heard proceeding from the wind incloſed, as in the tympany; in which caſe, there is alſo generally found ſome ſhare of water, made perhaps by the condenſation of the confined vapour: at other times the belly is ſo filled, that the fluctuation of the water may be eaſily perceived, either upon moving the body, or patting the part with the hand, as in the aſcites.

The ſeat of the leucophlegmatia is in that membrane, which modern anatomiſts call the adipoſe, or rather the reticular or cellular membrane, and which lies between all the membranes of the body and the muſcles.

The tympany is of more ſorts than one. Sometimes the confined vapour bloats up the abdomen, which gives a hollow ſound upon being ſtruck. And that vapour is an exhalation from ſome mortified viſcus; and therefore when let out, it is always extremely fœtid. This is a rare caſe, and yet I have ſeen one remarkable inſtance of it in St. Thomas's hoſpital. It was in an old man, whoſe belly ſwelled to that degree of tightneſs, that it ſounded like a drum upon being ſtruck; nor could a paſſage be procured downward either for excrement or wind, though the moſt powerful catharticks had been given. Upon opening the abdomen after death, there flew out with noiſe ſuch an exceſſively ſtinking vapour, that the ſurgeon cried out, he was poiſoned. We ſoon found the ſource of this ſtench to be the colon, which was inflamed and mortified, and adhered to the ſtomach mortified likewiſe. But yet it ſometimes happens without any putrefaction, that an elaſtick air engendered in the abdomen, and not finding any vent, puſhes forward, and bloats up the integuments by its expanſive force. And this is not pent up in the cavity of the belly, but in the very inteſtines; which it ſtretches to ſuch a pitch, as to de-

ſtroy

ſtroy their contractile power; and then their capacity is ſometimes widened to an almoſt immenſe degree [a].

The aſcites, or third ſpecies of Dropſy, is formed three different ways. For ſometimes the water is extravaſated between the tendons of the tranſverſal muſcles of the abdomen and the peritonæum, and by ſeparating them forms a tumour [b]; at other times the ſeroſities getting in between the two laminæ of the peritonæum (for this membrane is double) forces them aſunder, and forms to itſelf a large receptacle; but moſt commonly the water is collected, and ſtagnates in wide cavity of the abdomen itſelf. And upon diſſection I have ſometimes obſerved this water to be very clear, with many little tranſparent ſtrings, compoſed of ſlender veſicles that ſeemed linked together, floating in it; which were the coats of the burſted lymphatick veſſels, whoſe valves ſeparated them into different pieces, and formed hydatids.

But there is no ſpecies of Dropſy worſe than that of the ovaries in women. For theſe organs firſt grow ſcirrhous, then they are inflamed, and at length gangrened; they likewiſe ſwell to a vaſt ſize, being gradually ſtretched by the juices iſſuing out of their burſted lymphaticks, which are very numerous. Hence this diſeaſe is very ſeldom cured.

Theſe are the chief ways of forming collections of water in the belly, and I have ſeen inſtances of them all more than once: but the following caſe, which fell under my notice, while I was phyſician to the hoſpital, is very uncommon. A widow of forty-two years of age, who never had a child, complained of pains in her back, and difficulty of making water, for about twelve months; after which time ſhe perceived her belly to ſwell, and there ſoon appeared manifeſt ſigns of an aſcites: wherefore ſhe was tapped three different times; but the waters ſoon collected again after each tapping, and ſhe died in a fortnight or three weeks after the laſt puncture. Upon opening the body, there iſſued firſt from a cavity, formed by the ſeparation of the tendons of the tranſverſal muſcles from the peritonæum, a great quantity of water, in which floated many large entire hydatids. And afterwards, upon cutting the peritonæum, ſeven or eight pints of a thickiſh and viſcid humour were taken out, mixed with many corrupted glands. We wondered that none of the inteſtines appeared, which we ſought in vain, until, cutting through a membrane as thick as leather, we at length found the ſtomach with all the inteſtines and omentum collected into a narrow compaſs, and, as it were, lying hid there. The membrane immediately incloſing them was the inner lamina of the peritonæum; whoſe outer part being, as I have already obſerved, almoſt as thick as leather, did ſo far impoſe on us at firſt ſight, that we took it for the whole peritonæum. Thus the three ſpecies of aſcites above-mentioned, viſibly occurred together in this body, a curious, appoſite, and uſeful caſe.

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[a] See Memoirs de l'Academie Royale des Sciences, for the year 1713. pag. 235. and Philoſophical Tranſactions, N° 414. [b] See Cheſelden's Anatomy, Book iii. chap. 4.

Beſides all theſe collections of water, other parts of the body are alſo liable to the ſame diſtemper, as for example, the brain and teſticles. But water is no where attended with greater danger, than when collected in the breaſt: and this ſpecies of Dropſy moſt commonly happens to thoſe, who have long laboured under a difficulty of breathing, that ſort eſpecially which ariſes from polypi in the blood-veſſels; while the feroſities of the blood tranſude through the membrane of the lungs. I have ſeen ſeveral caſes of this kind, where there was from a pint to a quart of water collected, ſometimes in one ſide of the breaſt only, ſometimes in both, and ſometimes alſo in the very mediaſtinum. Now, as this water increaſes daily in quantity, by hindering the play of the lungs, it at length ſtops reſpiration, and the patient dies ſuddenly. In fine, in perſons who had been long ſubject to a palpitation of the heart, and ſhortneſs of breath, the pericardium itſelf has been found after death vaſtly diſtended with water.

But it is time to come to the cure of theſe Dropſies. In the leucophlegmatia, an inciſion ought to be made in the inſide of the leg, two fingers breadth above the ankle, as far in as the cellular membrane, and no farther; in order to ſerve as a drain for the water, which ſhould run for ſome days. And during this time, let the leg be fomented with a decoction of emollient and warm herbs, with an addition of camphorated ſpirit of wine; which method I have often found to be of great ſervice, not only in this ſpecies of Dropſy, but even in the aſcites itſelf: nay, in ſome caſes it has proved an abſolute cure, by draining off an almoſt incredible quantity of water for many days together. But care muſt be taken, not only in this particular inciſion, but in all others that are made in any part of the body for drawing off the waters, not to over-exhauſt the patient's ſtrength; which is as much affected by this evacuation, as if the ſame quantity of blood were drawn. Wherefore the patient is to be ſupported by all poſſible means, leſt what was intended for his cure may haſten his death;

whereof

whereof I have ſeen two inſtances, one of which, indeed, happened by my own fault, in not eſtimating the patient's ſtrength with ſufficient caution, and the other by the raſhneſs of a ſurgeon. And yet it is aſtoniſhing, how great a quantity of water, drawn off in this manner, hydropicks ſometimes bear to loſe, with eaſe and benefit: as will appear by this ſingular caſe.

A gentlewoman, related to me, of near fifty years of age, and of a good ſtrong habit of body, was ſeized with an anaſarcal and aſcital Dropſy at the ſame time; whereby her belly ſwelled to ſuch an exceſſive degree, that when ſhe lay in bed ſhe was quite oppreſſed by the weight. When her caſe was judged almoſt deſperate, I gave it as my opinion, that the only hopes, or rather chance remaining for her life, conſiſted in letting out the water by inciſions made in the ſmall of the leg. To this ſhe obſtinately refuſed to ſubmit, ſaying, that ſhe was now gone a great way on her journey out of this miſerable life, and did not chuſe to go back. But at length ſhe was prevailed on by the importunities of her friends; and a ſmall inciſion was made in each leg, in the manner above-deſcribed; through which iſſued a gallon of water at leaſt, every day for ten days together. In the mean time, regard was had to her ſtomach and ſtrength. Warm fomentations were applied to the part; and ſhe took twice a day a draught of infuſion of bitter herbs in water, ſuch as leaves of Roman wormwood, leſſer centaury, gentian root, and leſſer cardamom-ſeeds, with an addition of chalybeate wine. And every night ſhe drank the following draught, which I have frequently ordered in hydropick caſes, and found it very efficacious in promoting urine.

> Take of oxymel of ſquills one drachm and half; ſimple cinnamon-water, an ounce; compound ſpirit of lavender, ſyrup of orange-peel, each one drachm, mix.

She mended daily, and in time perfectly recovered her former ſtate of health. But ſhe was purged with proper catharticks, as ſoon as her ſtrength would bear them. And indeed this diſeaſe requires pretty powerful catharticks, and a frequent repetition of them; the chief of which are elaterium calomel, and jalap. Wherefore theſe were given at proper intervals: and the other medicines above-mentioned were continued daily for a long time; eſpecially, the diuretick draught, which ſhe never omitted for a whole year. Afte this courſe ſhe continued in good health for five years, at the end of which ſhe was ſeized with an acute diſeaſe that carried her off. Upon the whole, I make no doubt, but that deluge of waters flowed partly from the cellular membrane, partly from the ſack, formed by the tendons of the abdominal muſcles and the peritonæum, or by the diſtenſion of the two laminæ of the peritonæum.

Order brings me now to the tympany. And firſt, that ſpecies, which, as I ſaid above, proceeds from a mortification of any of the bowels, is abſolutely incurable; but that which is occaſioned by air, engendered and pent up in the very inteſtines, is to be treated with moderate catharticks frequently adminiſtered, and carminatives, to expel the wind, interpoſed; together with diet of very eaſy digeſtion. Likewiſe, bodily exerciſe ought not to be neglected; and it will be of uſe to throw up large clyſters of warm water; and alſo, what Celſus adviſes, to make ulcers in ſeveral parts of the belly with a red-hot iron, and keep them running a good while [c]. But if this operation ſhould appear cruel, it will be proper to lay bliſters on the abdomen, and repeat them now and then.

The aſcites is always a dreadful diſeaſe, whether its ſeat be on the outſide of the peritonæum, or within it, or in fine, in the cavity of the belly. Now, it is extremely material in this caſe, to conſider, what evacuations the patient is capable of bearing. For, when he is weak, violent purging is very prejudicial; and the more the ſeroſities are drained out of the inteſtines, the greater quantity of them flows into the belly. As ſoon as the phyſician obſerves this to happen, he ought to deſiſt, and to try to carry off the redundant water by the urinary paſſages. But all diureticks, even ſuch as are accounted the moſt powerful, are of uncertain effect in theſe caſes; for thoſe which anſwer in one patient fail in another; wherefore various ſorts are to be tried. Yet, generally ſpeaking, thoſe, into which ſquills enter, are the moſt efficacious. Of theſe the chief are, either the draught with oxymel above-deſcribed, or the freſh root itſelf, given in a ſmall quantity, as in the following bolus:

Take of the freſh root of ſquills five or ſix grains; of compound-powder of arum half a ſcruple; ginger-root five grains. Pound them together, and with ſyrup of orange-peel make a bolus, to be taken every morning.

Or, in fine, vinegar of ſquills, which will be leſs diſagreeable to the ſtomach, and better adapted to the intention, if it be given in this manner:

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[c] Lib. iii. cap. 21.

Take of lemon-juice, ſix drachms; of ſalt of wormwood half a drachm: mix, and add of ſimple cinnamon-water, an ounce and half; ſyrup of orange-peel one drachm; ſpirituous water of pepper mint, half an ounce; vinegar of ſquills, a drachm, or a drachm and half; make a draught, to be taken twice a day.

An infuſion of broom-aſhes is alſo beneficially ordered by phyſicians upon account of its diuretick quality; and if it be mixed with a little wine, it will often make a good common drink for the patient.

Upon this occaſion, I cannot omit recording a very remarkable caſe of a lady of quality of my acquaintance. This lady, when about fifty years of age, had a hard ſwelling in one ſide of the abdomen, which, without doubt, was one of the ovaries, grown to a very large ſize; and its lymphaticks burſting ſpued out their contents, and gradually formed an aſcites. Purgatives and diureticks of all ſorts were tried in vain. She was tapped three times, and ſoon filled up again. It happened at length, that a poor country-woman came to ſee her, who, obſerving her in great pain from the tenſion of her belly, eaſily perſuaded her to take, every day, night and morning, a ſpoonful of whole muſtard-ſeed, and drink on it half a pint of a decoction of green broom-tops. After three days taking this bitter potion in this manner, ſhe found herſelf vaſtly relieved; and her thirſt, which was very troubleſome, was entirely appeaſed. This medicine ſometimes gave her ſtools for two or three days ſucceſſively, and ſhe made five or ſix pints of water at leaſt every day. She continued this courſe for twelve months, and was cured without any return of the diſeaſe. Wherefore Hippocrates wiſely adviſes phyſicians, to enquire even of the lower claſs of people, if they know any thing uſeful for the cure of diſeaſes [d].

It will perhaps ſeem an uncommon, and even dangerous practice, to order narcoticks in this diſeaſe: but yet they are ſometimes ſo uſeful, that they may be placed among diureticks. For in caſe of great pain, they often promote a diſcharge of urine; which effect they produce, in my opinion, purely by relaxing the fibres of the renal ducts, which are always conſtringed by pain: as will appear by the following remarkable caſe:

A certain robuſt, ſober, temperate man, of about forty years of age, was afflicted with an aſcites and tympany together. The diſeaſe was owing to a violent blow, which he had received about ſix weeks before, in the right hypochondrium. The ſwelling of his belly daily encreaſed, with very ſevere pain, great thirſt, and thick, high-coloured urine, rendered in ſmall quantities. The moſt powerful diureticks, as Venice-ſoap, lixivial ſalts, balſam of Gilead, nitre, and the like, were preſcribed by another phyſician of great experience and myſelf; but all in vain: and ſtrong catharticks made the diſeaſe grow worſe. He was ordered to be tapped, but his friends would not conſent. Wherefore, as his pain was now become intolerable, and there were no hopes of his life, I thought of anodynes, in order to procure him ſome eaſe, at leaſt, in his laſt moments. And accordingly, I ordered him the following night-draught.

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[d] Μὴ ὀκνέειν παρὰ ἰδιωτέων ἱστορέειν, ἤν τι δοκέει ξυμφέρον Lib. Præcept.

Take of pepper-mint water, one ounce; ſimple cinnamon-water, half an ounce; ſpirituous cinnamon-water, two drachms; Thebaick tincture, forty drops; ley of tartar, half a drachm; ſyrup of marſh-mallows, one drachm; mix.

This procured him moſt unexpected eaſe, and ſome ſleep, to which he had been long a ſtranger; and he made that night, at different times, a quart of water at leaſt. This ſudden change ſurpriſingly raiſed his ſpirits. And as the patient found, that, while his eaſe from pain laſted, he had conſiderable diſcharges both by urine and ſtool; but, that he filled up again, when the effect of the anodyne was over; the ſame draught was ordered to be repeated every eight hours, and in a little time, it was thought ſufficient to give it but twice a day. But, whereas his appetite was diminiſhed by the conſtant uſe of this medicine, he took, one or twice a day, ſome ſpoonfuls of a chalybeate bitter infuſion; without neglecting the paregorick draught, whenever the pain returned. And this courſe was attended with ſuch ſucceſs, that to compleat the cure, he was ordered pills, compoſed of ſtorax pills one part; Peruvian bark two parts, made up with Chio-turpentine, to be taken twice a day; whereby he perfectly recovered.

Dr. Willis[e] has given a caſe, quite ſimilar to this, to which I refer the reader; as alſo to what the learned Spon has publiſhed on the ſame ſubject[f]. For the Dropſy, to the cure of which by twenty bleedings he was an eye-witneſs, as well as that above-deſcribed, may juſtly be ſuſpected to be owing to the præternatural heat and inflammation of the abdominal viſcera

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[e] See Pharmaceut. rational. Part i. ſect. vii. cap. 1.

[f] Aphor. nov. ſect. v. aphor. 81.

Having hitherto treated of things proper to be taken in this diſeaſe, it may not be amiſs to ſay a word or two on a very different method of cure, which is, by abſtaining from all kinds of drink for a long time; for even this method has had its abettors among the faculty. But certainly, it is very difficult to be ſtrictly purſued, as the patient is generally ſubject to exceſſive thirſt; which, if he be debarred from quenching, he ſuffers ſuch uneaſineſs, that poſſibly he may not think life worth purchaſing at ſo dear a rate. Nevertheleſs, I have known two perſons labouring under a very ſevere aſcitical Dropſy, who had reſolution and patience enough ſtrictly to practiſe this ſelf-denying method, and were both perfectly cured. And their way of aſſuaging their thirſt was, by waſhing their mouth and throat with the juice of ſour apples, or lemons, and now and then ſwallowing a very ſmall quantity of it.

But if the belly cannot be drained of its load of water, either by inciſions made in the legs, as propoſed in the anaſarca, or by any of the other helps above-mentioned; there will be a neceſſity of taking a ſhorter courſe of relieving the patient, I mean, by tapping. For this operation ſometimes preſerves, but ſeldom kills; and always conſiderably eaſes the pain occaſioned by the tenſion of the abdomen: beſides which, it has this great uſe, that it affords time and opportunity for adminiſtering proper medicines.

I know, that phyſicians are often averſe to this operation, grounded chiefly on the following reaſon. It is in vain, ſay they, to let out the water, ſince the injured internal parts furniſh a new ſupply of it: moreover, if it be let out by parts at different times, the belly ſoon fills up again; but if it be drawn off all at once, the patient dies immediately. Now, moſt certain it is, that when the bowels are mortified, the caſe is paſt all hopes; that letting out the water by parts is of no ſervice, and drawing it all off at once was commonly pernicious. Wherefore, in the year 1705, I began to inveſtigate the cauſe of ſo great an evil, in order to guard againſt it; and, if I am not miſtaken, it is as follows. By the long diſtenſion of the abdomen from the incloſed water, the diaphragm is thruſt up too high; the muſcles of the belly are ſtretched, the blood flows with greater freedom through the upper blood-veſſels, than through the lower; and in fine, the water by its preſſure, occaſions ſome new diſpoſition of the adjacent parts; whence upon letting out all the water at once, the diaphragm immediately moves lower down, as in its natural ſtate it uſually does; the blood ruſhes with unuſual impetuoſity into the lower or deſcending veſſels, and by the removal of the preſſure, the fibres ſuddenly loſe the extenſion which they had acquired, and the heat which the incloſed water had given them: hence ariſes a ſwooning; which returning often, and with encreaſed violence, throws the patient into cold ſweats, and ſoon carries him off. Now, the beſt way of preventing this fatal conſequence ſeemed to be, to preſs the belly hard with both hands, from the upper part downwards, while the water was iſſuing; and after it was all come away, to ſwathe the belly tight with a bandage.

I reſolved to make the firſt trial of this method in the hoſpital; and ſoon found a hydropick woman, who was a proper ſubject for my purpoſe. Wherefore ſhe was tapped, and as ſoon as the water began to iſſue from the puncture, I carefully laid my hands above the naval, one on each ſide, and preſſed the belly downward; and made the ſurgeon do the ſame thing below that part. But this I obſerved, that, if I took off my hands, but for a ſingle moment, the patient immediately fainted away. When all the water was drawn off, a piece of flannel, dipped in ſpirit of wine, was laid on the abdomen, and then a bandage was rolled tight all over it. To our great joy, the experiment ſucceeded according to our wiſhes. The patient made water plentifully, her appetite returned, ſhe ſoon gained ſtrength, and was perfectly cured without a relapſe. Of ſuch conſequence it is to have inveſtigated the true cauſes of things.

From that time, not only our own, but alſo foreign phyſicians have followed this method; and ſometimes, indeed, as it frequently happens in new experiments, with too much boldneſs. For, in caſes of diſeaſed livers, abſceſſes of the ſtomach, and bad habits of body, there is little or no reaſon to hope, that it will be attended with ſucceſs. Wherefore, ſome precautions are always neceſſary to be uſed before attempting it; the moſt material of which are laid down by thoſe ingenious ſurgeons, Mr. Cheſelden[g] and Mr. Sharp[h].

After all, I muſt confeſs, that with what prudence ſoever the phyſician diſcharges his duty, the Dropſy often returns. But, that notwithſtanding, a high value ought to be ſet on this diſcovery, by means whereof, I have known many lives not only prolonged for ſeveral years, but made tolerably eaſy, and ſometimes comfortably. Of which truth I could produce many examples, but ſhall content myſelf with the following one.

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[g] Anatomy of the human body, Book iii. chap. 10.

[h] A treatiſe on the operations of ſurgery, chap. 13.

A widow lady, whoſe opulent eſtate ſerved to render her virtues more conſpicuous, fell into an aſcites, in the fifty-firſt year of her age. For this ſhe was tapped ; but as ſhe ſoon filled up again, the operation was repeated once a month for the firſt year ; and at each tapping, one with another, there were drawn off forty-four pints of water. The next year ſhe was likewiſe tapped every month, and the whole quantity, being equally divided, made twelve pints each week. The third year the quantity of water began to diminiſh, ſo that there was but twenty-four pints for every month. And in the fourth and fifth years, and ſeven months of the ſixth, in which time ſhe underwent thirty tappings, each tapping amounting only to ſixteen pints. After the laſt time, ſhe began to grow weak and waſte away ; and ſhe was ſeized with almoſt a conſtant difficulty of breathing, as we obſerve in a Dropſy of the breaſt, attended with frequent faintings ; whereas before, through the whole courſe of the diſeaſe, in the intervals of tapping, ſhe was chearful in converſation, uſed exerciſe, and even diverted herſelf with dancing. But, now life began to ſit heavy upon her, and ſhe died at length, a very eaſy death. Now, it is very ſurpriſing, that a human body, in that ſpace of time, could furniſh ſuch a vaſt quantity of water, to wit, one thouſand nine hundred and twenty pints ; and it is my opinion, that this water was firſt collected in the ovaries. In fine, this good lady, for the information of poſterity, ordered by her will, that the following Engliſh inſcription ſhould be engraved on her monument.

Here lies Dame MARY PAGE,
Relict of Sir GREGORY PAGE, Baronet.
She departed this life March iv. MDCCXXVIII.
In the LVI year of her age.
In LXVII months ſhe was tapped LXVI times,
Had taken away CCXL gallons of water,
Without ever repining at her caſe,
Or ever fearing the operation.

And this monument is now to be ſeen in Bunhill-Fields.

Equally remarkable, but happier in the event, is the caſe contained in the following account. A maiden gentlewoman of ſeventeen years of age, obſerved, that her belly ſwelled gradually, and that ſhe made but little urine. She took various medicines, but ſtill grew worſe for a whole year; when her abdomen was as much diſtended as if ſhe had been far gone with child. At this juncture ſhe married, in hopes that a huſband would prove her beſt phyſician. But it happened quite otherwiſe; the Dropſy went on encreaſing for three years, when it came to that height, that there was reaſon to fear her belly would burſt. Her pain becoming now intolerable, ſhe deſired me to order her to be tapped by a ſurgeon of the hoſpital, who was ſaid to have good ſucceſs in that operation; in order to give her ſome eaſe at leaſt. Whereupon, as I did not care to be thought to kill a patient, whom I could not cure, I told her, that it could not be done in ſo emaciated a body without extreme danger. However, the miſerable patient ſtill continuing to urge me with earneſt intreaties, not to abandon her to conſtant tortures and a lingering death, I granted her requeſt; and at one tapping, managed in the manner above-deſcribed, there were drawn off ſixty pints of clear water, quite free from any offenſive ſmell. From that time ſhe gathered ſtrength daily, the diſeaſe never returned, and at the end of ten months ſhe was delivered of a luſty boy, and ſince had ſeveral children.

In fine, a ſtrong argument for the neceſſity of this operation is, that it is much ſafer, under proper reſtrictions, to let out the water, than to wait till it burſts the belly, and comes forth. For this caſe ſometimes happens, and is always attended with the utmoſt danger. However, I have ſeen one inſtance of a recovery from it, in a woman, to whom I was called. Her belly was ſo vaſtly ſtretched with water, that I pronounced the caſe incurable; becauſe ſhe ſeemed not to have ſtrength enough to bear the proper evacuations: but I was miſtaken. For, in a few days, hearing that ſhe was ſtill alive, I made her another viſit, and was much ſurprized on ſeeing two veſſels full of water, one containing twelve pints nearly, and the other ſix. The firſt quantity came away in one day through a crack in the abdomen near the navel; and the ſecond iſſued the next day from another crack, which happened near the ſame place; thus nature wiſely divided her remedy, and allowed it two days to operate. As I now found the patient exceſſively weak and faint, I ordered her nothing inwardly but cordials; but gave directions to foment the abdomen with ſpirit of wine; and withal, made my prognoſtick that ſhe would ſoon die. But, mulieri, ne mortuæ quidem, vix credendum eſt; I was miſtaken a ſecond time; for I ſaw her ſome months afterwards, quite recovered; nor did ſhe ever relapſe, as far as I could learn; and the cracks and burſtings of her belly united, without any other application but that above-mentioned.

I cloſe this long chapter with the hiſtory of a caſe, whereby it will appear, that nature ſometimes employs a very different method from that above-deſcribed, to eaſe herſelf of her load. I attended a certain merchant for an aſcitical Dropſy, with another phyſician of great experience; and after trying the uſual remedies to no purpoſe, we reſolved upon the paracenteſis, as the ultimate reſource. Accordingly the operation was performed, and about twenty pints of thin clear water were drawn off. In a few weeks his belly filled again. Whereupon, we agreed to meet the ſurgeon the next morning, in order to draw off the water by a ſecond tapping. As ſoon as we came to the patient, he looked at us, and ſmiled; ſaying, that he had no occaſion for any ſort of aſſiſtance; and ſtripping off the cloaths, he ſhewed his abdomen which was ſoft and relaxed. At this we were vaſtly ſurprized, and having aſked him, if he had had any kind of evacuation in the night, he aſſured us that he had none, either by ſtool, urine, or ſweat, more than uſual. Wherefore all the water muſt have been abſorbed by the glands and capillaries of the peritonæum and adjacent membranes. But afterwards this patient very imprudently committed himſelf to to the care of a certain quack, who, to prevent a return of the diſeaſe, gave him very ſtrong catharticks, which ſo exhauſted him, that he ſoon died conſumptive. Yet, upon diſſection, there was little or no water found in the abdomen.

Anatomiſts have long ſince diſcovered, that water is abſorbed from the belly into the circumjacent parts. For if a pint of warm water be injected, through a ſmall wound, into the abdomen of a live dog, and his abdomen be laid open a few hours afterwards, not a ſingle drop of the water will be found therein. Thus, as Hippocrates has juſtly obſerved, every part of the body, both outward and inward, is perſpirable [i]. But I refer the reader to the peruſal of what the learned Dr. Abraham Kaav has publiſhed on this ſubject, who demonſtrates that the humours are admitted into, and tranſude through all the membranes of the body, both in health and ſickneſs [k].

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[i] Ἔκϖνοόν καὶ εἴσϖνοόν ἐστιν ὅλον τὸ σῶμα Epidem. vi.

CHAP. IX.

Of the diſeaſe of the liver.

THE Liver is liable to very many diſeaſes; becauſe the affections of this organ are for the moſt part owing to the bile, which may be vitiated ſeveral ways. But the moſt common of all is the jaundice; and as what authors have written on this diſtemper has not given me thorough ſatisfaction, I think proper to enquire with ſome care into its nature.

SECTION I.

THE JAUNDICE.

The bile is a kind of natural ſapo, that is, a mixture of oil, water, and ſalt, both volatile and fixt, ſeparated from the blood, in the liver for various uſes of the animal body. And as the blood itſelf may be vitiated many ways, it is no wonder, that this humour is ſometimes rendered unfit for its offices. Now, it is often faulty by its lentor or viſcidity, and ſometimes alſo by its exceſſive thinneſs. In the firſt caſe, the ſecretory glands of the bile are obſtructed, and the ſmall quantity of it that is ſecreted, ſtagnates in the hepatick ducts; whence the liver grows hard, and under its tunicle are formed whitiſh concretions, reſembling hard ſoap. But this diſeaſe ariſes, not only from the viſcidity of the bile, whereby it ſtops in its paſſage, but alſo from its want of due conſiſtence. For here the volatile ſalt, which is one of the compounding principles of the bile, over-abounds; whence the bile becomes too thin, hot, and irritating to the inteſtines. In the former caſe, the body is too coſtive, and the fæces are hard, and of clay-colour; in the latter a diarrhœa, attended with a fever and thin yellow ſtools, conſtantly teizes the patient. Perſons who ſpend their lives in a ſedentary manner, without proper exerciſe, are moſt liable to the former; becauſe the oily part of the bile grows too thick and viſcid for want of a due proportion of ſalt: and thoſe who render their faculties uſeleſs, by too high feeding, and drinking ſpirituous liquors, are generally moſt expoſed to the latter.

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[k] In a book, intitled, Perſpiratio dicta Hippocrati per univerſum corpus anatomicè illuſtrata. Leyden, 1738.

But there is another ſpecies of Jaundice, owing to a very different cauſe from thoſe above-deſcribed, and that is, to nervous ſpaſms; when the ſubtile, elaſtick fluid of the nerves, by becoming too acrid and irritating, conſtringes the bile-ducts to a degree of hindering its paſſage through the liver; and conſequently, it muſt remain in the blood, and thence be thrown on the different parts of the body. That ſomething of this ſame kind follows upon violent colick pains, and the bite of the viper, we have ſhewn in another place [a].

I muſt alſo obſerve, that there ſometimes happens another ſort of conſtriction, occaſioned by the ſcirrhoſity of the abdominal glands; in which caſe, though the liver and gall-bladder be loaded with bile, yet no part of it can paſs into the inteſtines; of which, I formerly ſaw a remarkable inſtance in the hoſpital. It was in a working man of forty-two years of age, who, five months after recovering from an acute fever, was ſeized with an inflammation in the right hypochondrium; of which, when he was relieved, he fell into an obſtinate Jaundice, with coſtiveneſs and clayey ſtools, and died in a ſhort time. Upon opening the abdomen, we found four pounds of pure blood, in appearance at leaſt, floating in it. We wondered whence this blood proceeded, but ſoon obſerved ſome little membranes, which ſeemed to be the pieces of a burſted ſack, and the omentum was mortified in this place. The pancreas was not only ſcirrhous, but alſo cancerous; for, upon cutting into it, there flew out into the ſurgeon's face ſome drops of ſeroſity, of ſo acrid and corroſive a nature, that they burnt the ſkin like oil of vitriol. The ſpleen was ſcirrhous likewiſe. The gall-bladder, was very large, and full of bile; not yellow, but of a dark green, and too viſcid. There was no ſcirrhoſity in the liver; but in what part ſoever it was cut, the ſame ſort of bile iſſued. In fine, we obſerved, that every part of the body, membranes, fat, glands, nay, the very ſubſtance of the ribs, was of a yellow hue, except the muſcular fibres alone, which were not in the leaſt tinged. Upon preſſing the gall-bladder with the fingers, we could not force one drop of bile into the inteſtines; for at the union of the hepatick duct with the cyſtick, the paſſage was ſo vaſtly ſtreightened, that it would not admit a ſtyle. And my reaſon for relating this caſe is, to make appear, from how many different cauſes, and ſome of theſe fatal, this diſeaſe may ariſe.

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[a] Mechanical account of Poiſons, Eſſay I. edit. iv.

A diſeaſe, attended with ſuch a variety of circumſtances, requires different methods of cure. In caſe of coſtiveneſs with aſh-coloured or whitiſh ſtools, ſaponaceous medicines both alone, and joined with rhubarb, are neceſſary. When the belly is too looſe, the looſeneſs is rather to be moderated than ſtopped; which is beſt done by rhubarb with the admixture of an anodyne. But paregoricks are never more proper in this diſeaſe, than in thoſe caſes, which we have ſaid to be owing to a conſtriction of the biliary ducts by nervous ſpaſms. But in every kind of Jaundice, attended with actual inflammation, blood is to be drawn; and generally ſpeaking, a vomit is to be given.

This inflamation frequently ſuppurates, and turns to a vomica; from which, if pure white matter iſſues, it is a promiſing ſign; becauſe the evil lies in the tunicle or outward membrane. But if the whole ſubſtance of the liver is conſumed by it, the patient labours under a ſlow fever and great anxiety for a good while, and then dies. This cruel diſeaſe is very frequent in the Eaſt-Indies, as I have been aſſured by travellers; and is ſometimes cured by applying a cauſtick to the part, and letting out the humour. But the ulcer muſt be kept open a conſiderable time, as in the caſe of iſſues. This diſeaſe is taken notice of by the learned Bontius, who gives a method of cure, not much unlike that above-deſcribed [b]. And Celſus obſerves, that the ſame method was formerly practiſed by ſome phyſicians [c].

Laſtly, for correcting the bile itſelf, nothing is more uſeful than the following draught.

Take of lemon-juice ſix drachms; of ſalt of wormwood, half a drachm; of ſimple cinnamon-water, one ounce; of double-refined ſugar; one ſcruple; mix.

And it will be of ſervice likewiſe, in caſe of a looſeneſs, if its irritating quality be duly checked by opiates. Upon the ſame principle, Mynſicht's elixir of vitriol, taken in Bath or Spa-water, is a very good medicine.

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[b] See Hiſt. nat. & medic. Ind. orient. Lib. ii. cap. 8.

[c] Lib. iv. cap 8.

SECTION II.

THE DIABETES.

The Diabetes is an exceſſive diſcharge of urine, of the taſte, ſmell, and colour of honey; and that it is not a diſeaſe of the kidneys, as has been generally thought, but of the liver, I think I have proved elſewhere beyond contradiction[d]. I ſhall here avoid a repetition of what I then ſaid on that head; and ſhall only add one medicine more, viz aluminated whey, which is made thus:

> Take four pints of milk, boil it a little, and turn it with three drachms of alum.

If four ounces of this be taken three times a day at leaſt, it will contribute much towards ſtopping that flux.

Now, if it be aſked, whence can ſo great a quantity of water be ſupplied, as is diſcharged in this diſtemper; my anſwer is, that we find by eaſy experiments, that certain bodies ſometimes attract, and imbibe the watry particles floating in the air; whereby they are more or leſs increaſed in bulk and weight. Thus the ſalt of tartar, expoſed to moiſt air, encreaſes ſo prodigiouſly, that a ſingle pound of it duly calcined, ſwells to ten pounds weight. Therefore why may we not ſay, that ſome of the vapours of the ambient air enter into the human body, when properly diſpoſed to receive them; and theſe, being added to the ſeroſities, which are to be conveyed to the kidneys, and there ſecreted, encreaſe their quantity? Upon which account, as cold and moiſt air is very improper for perſons in this diſtemper; ſo they ought, if practicable, to go into a warm and dry climate.

In fine, in order to account for the infrequency of this diſeaſe among the antients, which was ſuch, that Galen ſays he ſaw it but twice only[e]: I am of opinion, that this proceeded from their manner of living, ſo very different from ours. For I have ſaid, that this diſeaſe moſt frequently happens to thoſe, who without due exerciſe, indulge themſelves with drinking vinous liquors; and then quench their thirſt ariſing from theſe, by too great a quantity of ſuch as are cooling. Whereas, the antients, though perhaps too much addicted to wine, were yet more prudent in this particular; for after a debauch, they returned to temperance by degrees, cooling their bodies gradually, and quenching their thirſt with warm drinks, or ſuch at leaſt, as were not actually cold.

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[d] Mechanical account of Poiſons, Eſſay I. edit. iv.

[e] De locis affectis, Lib. vi.

CHAP. X.

Of the diſeaſes of the kidneys and bladder.

BEFORE I proceed to the cure of the diſeaſes of the kidneys and bladder, it will be proper to premiſe a few things concerning theſe diſeaſes, the nature of which does not ſeem to have been explained by medical writers with ſufficient perſpicuity; though the knowledge of this point is very material for the cure.

I well remember, and have mentioned it upon another occaſion [a], that the diſſection of a boy about five years old, who died of ſevere nephritick pains, at which I aſſiſted many years ſince, afforded me an opportunity of obſerving the various degrees by which the human calculus had acquired the hardneſs of ſtone. For the kidneys and ureters were quite ſtuffed with a calculous matter; and it was very inſtructive, to ſee the different degrees of concretion in the ſeveral parts of it, from a clear limpid water to a milky liquor, which ſhot into ſlender branchy cryſtals; and theſe coaleſcing, became a hard friable ſubſtance.

Helmont, well verſed in chemical experiments, ſays [b], (and I think not without reaſon) that the matter of the calculus is a certain tartar formed in the kidneys, by a præternatural coagulation. For this opinion ſeems to be confirmed by the analyſis of the ſtone made by fire, and compared with that of tartar from Rheniſh wine. This experiment was made by the ingenious Dr. Stephen Hales [c], who found in tartar of Rheniſh wine, that the third part of the whole maſs is an elaſtick air; and that above half the calculus conſiſted of the ſame ſort of air; which proportion of air, he could never find in any other bodies.

Therefore, may we not conjecture with probability, that the proximate cauſe of this diſeaſe is tartarous ſalts conveyed out of the blood into the ſmall ducts of the kidneys? For it is the nature of theſe ſalts to contain and impriſon a conſiderable quantity of that ſubtile matter, which the illuſtrious Newton has ſhewn, beſides its other properties, to be the cauſe of the coheſion of bodies [d]. Thus the calculus is a ſubſtance compoſed of earth, and a very large ſhare of air, concreted in the renal ducts; and either remains therein, or drops down into the urinary bladder. Upon the whole, I have been the more particular on this head, in order to ſhew the ſeveral ways of treating this diſtemper.

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[a] Influence of the Sun and Moon, page 186. [b] See Supplementorum paradoxum numero criticum. [c] Statical eſſays, vol. i. p. 184 and 193.

And firſt, to prevent thoſe ſalts from ſhooting into cryſtals, lixivial ſalts ſeem to be extremely proper. Next, to keep the cryſtals from coaleſcing into a calculous ſubſtance, oily medicines are very efficacious. And this rule ought always to take place with regard to diet as well as medicines.

But when calculous concretions are actually formed in the kidneys, and are to be brought away by the ureters, the caſe requires very prudent management. It is a very common error in practice to give ſtrong, forcing diureticks, with an imaginary view of driving out the gravel with the urine: whereas, this intention is anſwered with greater ſafety, in moſt caſes, by relaxing and lubricating medicines; eſpecially, if, in caſe of violent pain, bleeding be premiſed, and anodynes interſperſed. For a ſtone is never forced out, while the patient is in great torture; though, when the pain ceaſes, it ſometimes comes away unexpectedly, and almoſt of its own accord, with the urine. And the reaſon of this is, that pain conſtringes the fibres of the parts, which reſume their natural ſtate, and perform their functions properly, when the troubleſome ſenſation is over. Wherefore, three or four grains of opium, diſſolved in five or ſix ounces of the common decoction, may be given by way of clyſter, which will greatly relieve the pain, and ſometimes procure greater advantages. However, there are conjunctures, after the pain is abated, when powerful diureticks may be adminiſtered: but with this precaution, that as ſoon as they have had their effect, they are no longer to be continued.

All this time the body ſhould be conſtantly kept open; wherefore, in caſe of coſtiveneſs, it will be expedient to give a turpentine clyſter; and ſometims to purge gently with infuſion of ſena and manna; but ſtrong catharticks are to be avoided.

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[d] See the life of Mr. Boyle, prefixed to his works, p. 70.

Of the lubricating medicines above-mentioned the chief are, oil of ſweet almonds, ſyrup of marſh-mallows, emulſions made with almonds, and the like; to which may be added, the uſe of the warm bath: but among the powerful diureticks, turpentine and ſoap are the beſt.

Such is the courſe to be purſued in the paroxyſm of the diſeaſe. But out of it, the patient ſhould uſe bodily exerciſe, eſpecially riding every day, but ſo as not to fatigue: his food ſhould be mild, and of eaſy digeſtion; and his drink either ſmall wine and water, or new ſoft ale, which will be rendered better and wholeſomer, if ground-ivy leaves be infuſed in it, while it is working. Mead is likewiſe a proper drink; for honey is an excellext diuretick. A ſpoonful alſo of honey in a glaſs or two of the infuſion of marſh-mallows roots is an admirable cleanſer of the kidneys, if uſed for a conſtancy. The wines ought to be the ſofteſt and ſmootheſt that can be had, and the lighteſt; cleareſt river or running-water is preferable to all other. For, as Pliny ſays, "thoſe ſprings are particu-"larly condemned, the waters of which line the veſſels in "which they are boiled with thick cruſts[e]."

But particular care ſhould be taken, not to put the patient into a courſe of powerful diureticks, with a view of preventing the gravel from concreting in the kidneys: becauſe, whatever great things may be ſaid of this ſort of medicines by ignorant pretenders, they certainly injure the parts by their heat and acrimony. Nor can I avoid obſerving, though I am extremely ſorry for the occaſion, that ſome gentlemen of the faculty a few years ſince acted a part much beneath their character, firſt, in ſuffering themſelves to be impoſed on, and then, in encouraging the legiſlature to purchaſe an old woman's medicine at an exorbitant price; by vouching, that it was capable of breaking the ſtone in the bladder, and bringing away the fragments with the urine. This medicine is a compoſition of ſoap and lime made of different ſhells, which every body knows to be highly cauſtick. And while the ſcheme was carrying on, ſome ſtones cut out of the bladders of patients, who had uſed the medicine, were very induſtriouſly handed about, as a teſtimony of its lithontriptick quality; becauſe theſe ſtones had inequalities, and holes here and there in their ſurface, which were aſſerted to be eroſions made by the medicine. But thoſe gentlemen ought to have known, that ſtones are ſometimes naturally formed in the bladder with ſuch inequalities and pits on their ſurface, as may be miſtaken for real eroſions: ſeveral examples of which have fallen under my own obſervation. So great is nature's variety in forming calculous concretions. But upon this ſubject, I refer the reader to a very uſeful book, publiſhed ſome years ſince by a ſkilful anatomiſt and phyſician; in which both the miſchiefs done by this medicine, and the artifices employed to bring it into vogue, are ſet in a clear light[f].

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[e] Nat. hiſt. Lib. xxxi. cap. 3.

Now, whereas ſuch vaſt encomiums were beſtowed on this new medicine, as it was then called; it was no way ſtrange, that our legiſlature ſhould deſire to purchaſe the manner of making it at almoſt any price, in order to publiſh it for the benefit of the commonwealth. And indeed, the purchaſe redounds as much to their honour, as it does to the diſcredit of their adviſers; who ought to have known, that things endued with ſuch a corroſive quality, as to be able to diſſolve the ſtone, could not lodge in the bladder without injuring that organ. Upon the whole, that compoſition, under due management, may be of ſome ſervice in expelling gravel by the urinary paſſages; but it will never be able to break calculi of the hardneſs of ſtone: and beſides, its long continued uſe muſt be attended with great danger, for the reaſons above-given. And as for its ſubſtitute, the ſoap-leys, though it be a medicine of a more commodious form for taking; yet it will not prove much ſafer in its conſequences, for the ſame reaſons.

Nevertheleſs, as nothing ought to be diſguiſed, no truth concealed, in a matter of ſuch moment; I think proper to take notice of what the learned Dr. Robert Whytt of Edinburgh found by experiments relating to the preſent enquiry[g]. For that gentleman, after ſeriouſly conſidering the inconveniencies, and ſometimes the miſchiefs alſo, of this celebrated ſpecifick, reſolved to omit the ſoap, and try what virtues lime-water might have in diſſolving the calculus. His firſt experiments were made on ſeveral fragments of calculi with lime-water from common quick-lime; and afterwards reſolving to try the power of animal-lime, he repeated them with lime-water, made with oyſter-ſhells and cockle-ſhells well calcined, by pouring ſeven or eight pints of water on one pound of the freſh-calcined ſhells. The experiments ſucceeded with both ſorts; but he ſoon found, that the oyſter and cockle-ſhell lime-water poſſeſſed a much greater power of diſſolving the calculus than that of ſtone-lime. Then he propoſes the method of drinking the ſhell lime-water, the quantity of which may amount gradually to four pints every day for adults, and for children leſs in proportion: and he concludes with inſtances of the happy effects of this method.

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[f] Parſon's Deſcription of the human urinary-bladder, &c.

[g] Medical eſſays, Edinburgh, vol. v. eſſay 69.

His whole diſſertation is very well worth the peruſal. And I have given this ſhort account of his method with the greater pleaſure, becauſe an eminent phyſician here in London, lately aſſured me, that he cured a certain merchant, who was grievouſly afflicted with the ſtone, by this very method: whereby he diſcharged by urine a great number of ſmall pieces, ſome like the coats, others like ſmall nuclei of ſtones. But it is never to be expected, as I have ſaid above, that ſtones, which have acquired a degree of hardneſs little inferior to flint, can be broken or diſſolved by any medicine whatſoever.

Therefore I heartily congratulate my fellow-citizens upon the ſkill and dexterity of our ſurgeons, who have invented a new way of cutting for the ſtone with greater ſafety and diſpatch [h]. For now, not only children and youths, but alſo perſons advanced in years, may ſubmit to this operation without great danger: and in caſe the ſtone prove too big to be extracted without tearing the neck of the bladder, it is now no longer neceſſary to ſplit the ſtone (before the extraction); the invention of which is aſcribed to Ammonius, a Greek phyſician, who from thence was ſurnamed (Λιθοτόμος) the lithotomiſt [i].

CHAP. XI.

Of the diſeaſes of the eyes.

THE diſeaſes of the Eyes have been treated of by medical writers with ſuch care, that I think it almoſt unneceſſary to ſay any thing here concerning them. Among the antients Celſus [a] in particular, and among the moderns Plempius [b], have moſt accurately enumerated and diſtinguiſhed them. The former indeed was poſſeſſed of the works of the Greek phyſicians and ſurgeons, which are not come down to us, and out of which he ſelected ſeveral very good medicines with great judgment: and the latter has made uſe of all the modern diſcoveries, to improve the practical part. To theſe two authors I would add a book, compoſed by two eminent mathematicians; in which every thing relating to viſion is explained with great perſpicuity [c]. And Dr. Porterfield's diſſertations on this ſubject [d] are extremely worthy of a ſerious peruſal.

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[h] See Cheſelden's Anatomy, chap. vi. of the fifth edition.

[i] Celſus, Lib. vii. cap. 26.

[a] Lib. vi. cap. 6.

[b] Ophthalmographia. Lovan, 1659.

Wherefore I ſhall content myſelf with making a few remarks on ſome very conſiderable diſeaſes of the eyes, the nature of which has not been ſufficiently underſtood by the generality of practitioners.

SECTION I.

OF THE GUTTA SERENA.

What the Greeks named ἀμαύρωσις, and the Latin writers of the lower ages expreſſed by the barbarous word Gutta Serena, is a very ſevere diſeaſe, and of very difficult cure. It proceeds from various cauſes, of which the moſt common is an obſtruction gradually formed in the arteries of the retina by a ſizy blood. For, the conſequence of this obſtruction is, that the rays of light which ſhould depict the images of objects on the bottom of the eye, falling on theſe dilated blood-veſſels, produce no effect; whence the ſight is either diminiſhed, or entirely loſt, according to the degree of the obſtruction. Again, this diſeaſe is ſometimes owing to a palſy of the nerves of this ſame membrane; as it in ſome meaſure deſtroys their ſenſibility; whereby the impulſe of the corpuſcles of light on them is not ſufficient to make them tranſmit objects to the brain. In fine, I have obſerved, that this ſpecies of blindneſs is alſo occaſioned by a preſſure on the optick nerves, either by the extravaſation of a glutinous humour, or by a hard tumour formed upon the place, where they paſs from their thalami into the eyes; whereby the paſſage of the animal ſpirits to the brain is totally intercepted.

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[c] A complete ſyſtem of opticks, by Robert Smith, LL. D. with an eſſay upon diſtinct and indiſtinct viſion, by James Jurin. M. D. Cambridge, 1758.

[d] See Medical eſſays, publiſhed at Edinburgh, vol. iii. p. 160. and vol. iv. pag. 124.

So many are the accidents incident to the eye even in one diſeaſe. Let us now conſider how to preſerve this organ, which has ſo great a ſhare in making life uſeful and agreeable.

And firſt, we ought to know how to diſtinguiſh the ſeveral ſpecies of the Gutta Serena above-mentioned, and their good and bad ſymptoms.

Wherefore a gradual dilatation of the pupil is a ſign of an obſtruction in the blood-veſſels by a ſizy blood. For this dilatation is the work of nature; in order that the detriment which the ſight ſuffers by many of the rays of light falling on the ſmall arteries, inſtead of the nervous fibrillæ, may be compenſated by taking in a greater number of theſe rays. Hence the palſy of the nerves, with which they are frequently ſtruck at once, ſeldom or never occaſions this dilatation. But the preſſure on the optick nerve, either by an extravaſated humour, or a tumour gradually encreaſing, is attended with a wider pupil for the aforeſaid reaſon.

Upon this principle it is, that the ſecond and third ſpecies of the Gutta Serena may be deemed incurable. For what medicine can be adequate to the removal of a ſudden relaxation of the nerves, or of a load of extravaſated humours, or a tumour formed within the ſkull, which are rendered inacceſſible by their very ſituation? Wherefore it is only the firſt ſpecies of this blindneſs that is curable. Unleſs there may perhaps be ſome faint hopes of relieving that ſort, which proceeds from a palſy of the retina, by antiparalytick medicines; of which the principal are aromaticks, chalybeates, and the fœtid gums.

But it is time to come to the cure, which in general, conſiſts in removing the obſtruction of the veſſels, and correcting the lentor of the blood. Wherefore, firſt of all, blood is to be drawn both from the arm and the jugular, and to be repeated according to the degree of the diſeaſe. And it will be of uſe to apply cupping-glaſſes, with deep ſcarifications under the occiput; in order to let out blood this way from the lateral ſinuſes of the brain. Then it will be neceſſary to give cathartick, eſpecially ſuch as purge groſs humours. But as nothing is found more powerful than quickſilver for inciding and expelling groſs and viſcid humours, it will be very proper to join calomel to other cathartick; or rather to take it by itſelf, and a few hours after it, ſome gentle purgative.

And this method often ſucceeds, when the diſeaſe is beginning or recent; but if it be of ſome ſtanding, it requires a more powerful treatment, that is, a plentiful ſalivation, raiſed by mercurials, taken inwardly in ſmall quantities, and at ſhort intervals. For mercury, by its extraordinary weight and diviſibility into extremely minute globules, penetrates into the inmoſt receſſes of the body, ſcours the glands and veſſels, and carries off the ſordes by the moſt convenient outlets.

I made the firſt trial of this courſe on poor patients in the hoſpital, when I was a young practitioner, and afterwards on others, who thereby recovered their ſight; for which I was complimented by the phyſicians, who till then had looked on the diſeaſe as incurable, eſpecially, if confirmed by time. Now the motive, which determined me to try the effect of this courſe, was, that I had found by the laws of opticks, that certain corpuſcles, floating in the aqueous humour of the eye, could not be the cauſe of this diſeaſe, according to the common opinion; becauſe they muſt be too near the bottom of the eye to be able to depict their image there. Wherefore there was a neceſſity of ſeeking ſome other cauſe; and whether I have found the true one, is entirely ſubmitted to mathematicians. For my part, I cannot help thinking, that this invention is a remarkable inſtance of the great uſe of true mathematical knowledge towards eſtabliſhing a right method of practice.

SECTION II.

Of the CATARACT.

The Cataract, by the Greeks named *γλαύκωμα*, by the ancient Latins ſuffuſio, and by the moderns cataracta, is an opacity of the cryſtalline humour, which from tranſparent is generally changed to a greyiſh colour; whereby the paſſage of the rays of light to the bottom of the eye is intercepted.

Phyſicians in all former ages, were of opinion, that this ſpecies of blindneſs was owing to a membrane præternaturally growing before the cryſtalline humour, and covering its anterior ſurface in the manner of a veil; and that the ſight was reſtored by depreſſing this membrane with a needle. But the erroneouſneſs of this opinion has been at length diſcovered and demonſtrated in this century. For in the diſſection of eyes, both of perſons who had been afflicted with Cataracts, and had never been couched; and of others, on whom the operation

tion had been performed with ſucceſs; there was not the leaſt appearance of a membrane, but the dryneſs, hardneſs and opacity of the cryſtalline humour or lens was found to be the cauſe of the diſeaſe [e].

However, I muſt not omit taking notice, that a real membrane has been ſometimes found, though the caſe be very rare [f]: an inſtance of which has been lately ſhewn me by our excellent anatomiſt Dr. Thomas Lawrence, in an elegant preparation of a child's eye injected by him; in which there plainly appeared a membranous expanſion that covered the pupil, and had its blood-veſſels filled with the injection. And hence I draw this general inference, that although it be very certain, that in moſt caſes of this diſeaſe, it is the cryſtalline humour that is removed out of its place by the operation; yet it may ſometimes happen, that the needle depreſſes a membrane which by ſome accident was grown hard and opake.

Upon the whole, the hand of a ſkilful ſurgeon is the only remedy in this diſorder. But the operator ought to wait for a certain degree of ripeneſs of the Cataract, and give attention to other circumſtances; in order to determine the time of performing the operation with ſafety, and a proſpect of advantage.

SECTION III.

OF THE ALBUGO.

The Albugo, or white ſpeck in the eye, is likewiſe a troubleſome diſeaſe, which is more or leſs offenſive to the ſight, according to the greater or leſſer portion of the tranſparent part of the cornea affected by it. For ſometimes it fixes on the exterior ſurface only of this membrane, ſometimes on the interior; and ſometimes, in fine, it runs more or leſs deep into it.

It is moſt commonly the conſequence of inflammations, by the extravaſation of humours between the membranes of this tunicle; and particularly in the ſmall-pox, by the ſuppuration of puſtules upon this part.

I have made uſe of two methods of cure for this diſorder of the ſight; the one in the outward ſort, the other in the inward. In the former caſe, I ordered the following powder.

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[e] See Antoine Maitre—Jan, Traité des maladies de l'oeil. Troyes, 1707.

[f] See Hiſtoire & memoires de l'academie royale des ſciences. Paris, 1708.

> Take of common glaſs any quantity. Pound it in a mortar into a very fine powder: then add an equal quantity of white ſugar-candy, and levigate the mixture on a marble with great labour, till it becomes quite impalpable.

A little of this powder, put into the eye with the quill every day, gradually abſterges, and wears off the ſpot by its inciding quality. The other method above-mentioned of removing this ſpeck is, to order a dexterous ſurgeon to pare it cautiouſly every day with a knife; for this tunicle is compoſed of ſeveral lamelæ, one over another, and has thickneſs enough to bear paring off ſome of its parts. I have ſeen ſeveral inſtances of cures by the eye-powder; but the paring off the cornea has not ſucceeded with me above once or twice. However, it is better to try a doubtful remedy than none.

THE FORCE OF ODOURS.

I have hardly any thing of great moment to propoſe concerning the reſt of the ſenſes; except a few hints relating to the organ of ſmelling. For as daily experience convinces us of the great power of ſcents, both to do harm and good; I think it may be of uſe to give ſome ſhort remarks on them.

And firſt, their miſchievous effects in communicating contagious diſeaſes are ſufficiently manifeſt. For it is moſt certain, that the ſubtile effluvia, which iſſue from an infected body, being taken in with the breath, do infect a ſound habit. Moreover, every body is ſenſible, at one time or other, that from this cauſe proceed head-achs, and ſickneſſes at ſtomach by the acquired ill-quality of the ſpittle. But on the other hand, nothing is more notorious than the great energy of odoriferous things in repairing our ſtrength. And this is effected, either by the animal ſpirits being rouzed out of a ſtate of oppreſſion, or by being refreſhed and recruited by ſuch things as emit particles, that are friendly and agreeable to nature, applied to the noſe. For effluvia of this kind are, as it were, a proper food for the animal ſpirits.

Now, of all the odoriferous bodies hitherto known, the moſt powerful are ſpirits and volatile ſalts extracted by fire from animal ſubſtances; and next to theſe are thoſe animal-glands diſtinguiſhed by the names of caſtor, muſk, and civet. But there may perhaps be juſt cauſe to admire, that theſe bodies

dies do not equally agree with all conſtitutions. For many are wonderfully refreſhed by muſk and civet; whereas, we ſee others, who are more or leſs over-powered, even to a degree of ſickneſs and fainting, by the ſcents of theſe ſame perfumes; and yet are refreſhed and revived by caſtor and aſa fœtida. This difference ſeems, in my opinion, to ariſe from a different habit of the nervous fluid in different perſons; and nature generally points out, which of this claſs of bodies will be beneficial, and which hurtful to each individual. Nor have I the leaſt doubt, but that a ſenſe of the efficacy of theſe things is conveyed to the mind by the fluid of the nerves. And ſuch is the wiſdom and goodneſs of the ſupreme Creator in the conſtruction of our frame, that he has made thoſe things pleaſant to the ſenſes, which are proper for the preſervation of life, or neceſſary for the propagation of the ſpecies. Nevertheleſs, moderation is to be conſtantly obſerved in all theſe things, to prevent the allurements of pleaſure from hurrying us into exceſſes, which may prove prejudicial both to the ſoul and body.

CHAP. XII.

Of the GOUT.

THE Gout is moſt commonly a diſeaſe of perſons, who have too much indulged themſelves in high living; in which nature endeavours to throw the load of noxious matter out of the body upon the joints. Thus this diſorder is rather to be deemed a criſis of the diſeaſe, than the diſeaſe itſelf: and in this view, great care and prudence are required, to facilitate nature's attempt in producing the effect. Wherefore, the pain is by no means to be mitigated by external remedies of any kind whatſoever. For by attempting this, the gouty humour may be thrown back upon the vital organs in an inſtant, and the patient's life put into imminent danger; which ſeems to afford a remarkable proof, that this violent commotion in the body is owing to a very ſubtile and active fluid, and ſuch is the nervous juice. But in caſe this fiery humour ſhould happen to remove from the limb into the body, all poſſible means ought to be uſed, to make it return on the part. And this is to be done by blood-letting; the warmer cathartics, which are not violent in their operation; alexipharmicks; and above all, by epiſpaſticks laid on the limbs, with regard always had to the place affected. For nothing is more deſirable, than that the evil ſhould fix for ſeveral days on thoſe parts of the extremities of the body, which it has firſt taken poſſeſſion of; becauſe, when it once returns into the habit, it is with great difficulty driven out again: ſo that, perhaps, it may be juſtly ſaid, that the Gout is the only cure of the Gout.

The ſeat of this diſeaſe is in the ligaments of the joints, the tendons of the muſcles ſubſervient to their motions, and the membranes ſurrounding the bones. And when the acrimonious humour has fallen on theſe parts, it irritates and frets them: hence ariſes an inflammation, and a painful tumour is formed by the oozing of the thinneſt part of the juices out of the minuteſt ramifications of the arteries and nerves. For nature makes uſe of pain as an inſtrument; and the ſharper it is, the more ſpeedily and ſafely ſhe finiſhes her work. Sometimes, indeed, ſhe does it ſlowly, as if ſhe neglected her duty; and in ſome habits of body ſhe protracts the torture a longer time than uſual, as if her intention was to divide her medicine. But when the tumour ſubſides, part of the extravaſated humour, which could not perſpire through the pores of the ſkin (and there is but a ſmall portion of it, indeed, that is exhaled this way) is abſorbed into the veins and lymphaticks; while the thickeſt part of it ſticks to the membranes: and freſh quantities of it being lodged there in every fit of the Gout, it ſometimes concretes into hard maſſes, commonly called chalk-ſtones, which by degrees ſtuff the joints, and deſtroy their action.

As to the medical treatment, different methods are to be purſued in the fit, and out of it. Quiet is not only indicated, but inforced by the very incapacity to motion. In caſe of a fever, the diet ſhould be the ſame as in acute diſeaſes; otherwiſe, common food of eaſy digeſtion may be allowed. For great care muſt be taken of the ſtomach and ſtrength. And this circumſtance, which I have ſcarcely ever remarked in any other diſtemper, is here to be obſerved; that when the Gout has ſeized the ſtomach, this organ becomes ſo cold and torpid, that wine ſeems no ſtronger than water; and it requires, and eaſily bears the hotteſt liquors, ſuch as ſpirits drawn from wine. Wherefore, not only generous wines are to be given in pretty large quantities, but alſo vinous ſpirits, rendered more efficacious by the infuſion of ſnake-root, ginger, or garlick. And if theſe ſhould not prove powerful enough, it will be proper to order the powders of ſnake-root, ginger, and long-pepper, mixed with the cordial confection, to be taken by the mouth.

It has been diſputed among phyſicians, whether, or not, a vein may be opened, when the pain in the joint is extremely ſevere. Now, to ſettle this point, we ought never to forget, that this pain is highly neceſſary for tumefying the part, and therefore ought to be borne with patience. This however notwithſtanding, (ſeeing it is certain, that exceſſive heat is an obſtacle to the natural ſecretions from the blood, which are neceſſary for health) if the fever run very high, and eſpecially, if it be attended with a delirium, or difficulty of breathing, blood-letting will not only leſſen the pain, but likewiſe happily promote the iſſue of the humour [a]. Nay, it will be requiſite to repeat the operation, when there appear ſigns of a comatoſe diſpoſition. For I have very frequently obſerved phyſicians to be too timorous with reſpect to this evacuation, from a notion, that it would prevent the gouty humour from being thrown upon the joints. Upon the whole, one effect of blood-letting is generally, to make the diſeaſe abandon the place where it was lodged; and the great benefit of this removal in ſeveral caſes is manifeſt. But as for anodynes, they are not to be allowed, excepting in vomiting and looſeneſſes. Nor do gouty people (to ſay it once for all) bear carthicks well, till the paroxyſm is over; and then they may be given, to carry off the remains of the morbid humour, which raiſed the tumour.

Of greater difficulty and moment is the queſtion concerning the regimen, whereby a perſon may entirely rid his conſtitution of this tormenting diſorder, and keep it off for the future. Upon which, the firſt conſideration ought to be, whether that can be done with ſufficient ſafety and advantage to the patient. For, as to elderly people, who have been accuſtomed for many years to returns of the diſeaſe, if the fits come on no more, their bowels are attacked inſtead of their joints; and beſides, they are ſeized with ſuch weakneſs in their legs and feet, that the remainder of their life is quite miſerable: and of this I have ſeen more than one inſtance in perſons, who had abſolutely confined themſelves to a milk and vegetable diet.

Therefore, if any one be deſirous of trying the experiment, and running the riſk of its conſequences, let him remember, that he ought to be young, and not to have had above two or three fits of the Gout. Then let him obſtinately abſtain from wine and all other fermented liquors, and for drink, confine himſelf to water. Let his food be milk, and things made from it, and vegetables; beſides which, he may make one meal a day on fleſh of the tender ſort, ſuch as that of chickens, fowls, and rabbits, and now and then on freſh-water fiſh. Let him uſe daily exerciſe, but with moderation. By this courſe of living, I have known ſome live comfortably to a good old age, without the leaſt attack of the Gout. Of ſuch conſequence it is to live according to nature, that is, to practiſe temperance. And a trial of this courſe of life is in a peculiar manner adviſeable for thoſe, who may expect to be puniſhed for the irregularities of their parents, not for their own, by a hereditary Gout; in order to prevent its ſeeds, ſown in their blood and nervous fluid, from producing diſagreeable fruits in time.

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[a] See Diſcourſe of the Small Pox, chap. iii.

I ſhall cloſe the preſent chapter with this admonition, that although I ſaid above with great truth, that this diſorder is rather to be deemed a criſis of the diſeaſe, than the diſeaſe itſelf; yet ſometimes, eſpecially in old age, it is a very ſevere evil; when the ſtrength is ſo decayed, and the limbs ſo weakened, that bodily motion is loſt, and with it a conſiderable ſhare of the comforts of life. However, this, like all other calamities, is alleviated by patience. And perhaps, it may be ſome conſolation to others, as well as it was to Sydenham, in the midſt of tortures, that great monarchs, potentates, generals, admirals, philoſophers, and many others like them, lived, and at length, died in the ſame manner [b].

CHAP. XIII.

Of pains in the joints.

THOSE pains of the joints, which are accompanied with inflammation and tumour, have an affinity with the gout. The proper method of curing them is by bleeding, bliſtering the parts affected, and, unleſs the fever runs high, by purging. If there be no fever, or but a ſlight one, a mixture of equal parts of gum-guaiacum and cinnabar of antimony will prove a very good medicine, both to open the body and correct the acrimony of the humours. It ſhould be given ſo as to procure two ſtools at leaſt every day.

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[b] Tract. de Podagra. ed. 1. pag. 24.

Of all theſe pains the moſt ſevere is that, which the Greeks name ἰσχιὰς, (and we corruptly ſciatica) becauſe it ſeizes the hips ; and it is attended with the greater difficulty, becauſe it is moſt commonly the conſequence of chronical diſeaſes, by the morbid matter being thrown on this part. This diſeaſe, when grown inveterate, weakens the thigh and leg, and makes the patient lame : and ſometimes alſo the head of the thigh-bone ſlips out of the ſocket, and then the thigh ſoon waſtes away.

In this diſeaſe, little is to be expected from cupping or bliſtering the part ; for the acrid humour lies too deep fixed in the membrane ſurrounding the bone, to be drawn out by theſe means. More efficacious is the volatile epithem, or a plaiſter compoſed of Burgundy pitch, with about an eighth part of euphorbium, and a ſufficient quantity of Venice turpentine.

But nothing gives ſo much relief, in an obſtinate caſe eſpecially, as a ſeton paſſed below the part affected, in order to give vent to the morbid humour. But, if this operation be thought to be too cruel and troubleſome for the neceſſity of it, it will be of uſe to make an iſſue, with a cauſtick in the inſide of the thigh above the knee ; which muſt be kept open till the diſorder is quite removed. Celſus [a], following the example of Hippocrates [b], adviſes to apply the actual cautery in three or four places upon the hip. And indeed, no remedy would be more efficacious than this, if patients could be reconciled to it ; for how terrifying ſoever the ſight of red hot iron may appear, the pain from the application of it would be much ſooner over, than that which is raiſed by the common cauſticks.

The fleſh-bruſh ought likewiſe to be uſed ſeveral times every day, in order to facilitate the digeſtion and diſſipation of the concreted humour ; and more eſpecially on the very hips, if practicable. But fomenting the part affected with warm water is generally prejudicial ; becauſe this brings on a relaxation of the fibres, whereby the pain is encreaſed.

I now paſs to internal remedies, the chief of which are bleeding and purging. Of cathartiks, the moſt efficacious are dulcified mercury ſix times ſublimed, and the electuary of ſcammony ; either of which muſt be often repeated, according to the patient's ſtrength. And in the intermediate days of purging, the proper medicines are ſuch as are diuretick and laxative at the ſame time. Of this claſs, I give the preference to the volatile tincture of gum-guaiacum, or the balſam of guaiacum.

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[a] Lib. iv. cap. 22.

[b] Aphor. 6. 60.

CHAP. XIV.

Of the diſeaſes of the ſkin.

I SHALL ſay nothing at preſent of thoſe eruptions which happen in fevers; nor of the blotches and ſpots which appear on the ſkin in ſcorbutick habits; becauſe all theſe are treated of in their proper places [a]. But of all the diſeaſes which infeſt the ſurface of the body, the moſt filthy is the leproſy. This is of two kinds, the one is named the leproſy of the Greeks, the other that of the Arabians: but I have conſidered them both in another book, with regard to their nature and method of cure [b].

The diſeaſe next to this in foulneſs, but of a very different origin, is the itch. This firſt appears in a reddiſh roughneſs of the ſkin; which is ſucceeded by pimples, that let out matter or a ſharp ichor; and the exulceration is attended with itching, and ſpreads by contagion. It may juſtly be called an animated diſeaſe, as owing its origin to ſmall animals. For there are certain inſects, ſo very ſmall as hardly to be ſeen without the aſſiſtance of a microſcope, which depoſite their eggs in the furrows of the cuticle, as in proper neſts; where, by the warmth of the place, they are hatched in a ſhort time; and the young ones, coming to full growth, penetrate into the very cutis with their ſharp heads, and gnaw and tear the fibres. Their bitings cauſe an intolerable itching, which brings on a neceſſity of ſcratching, whereby the part is torn, and emits a thin humour, which concretes into hard ſcabs. While the little worms, conſtantly burrowing under the cuticle, and laying their eggs in different places, ſpread the diſeaſe.

Hence the reaſon manifeſtly appears, why the diſeaſe is communicated by the linen, wearing-apparel, gloves, &c. which were uſed by infected perſons. For the eggs, which had ſtuck to ſoft ſubſtances of this kind, are rubbed into the furrows of the cuticle, and are there hatched and nouriſhed.

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[a] Chap. of Fevers, and the Scurvy.

[b] See Medica ſacra, chap. ii.

Now what is of greateſt moment in this theory is, that the knowledge of the true cauſe of the diſeaſe naturally points out the cure. For neither cathartick, nor ſweetners of the blood, are of any ſervice here; the whole management conſiſts in external applications, in order to deſtroy theſe corroding worms; and this is eaſily effected. Wherefore, firſt, let the patient go into a warm bath, and then let the parts affected be anointed every day, either with the ointment of ſulphur, or the ointment with the precipitate of mercury, which is leſs offenſive to the olfactory organs; inſtead of which a liniment may be made of orange-flowers, or red roſes, the mercurial, red corroſive and hog's lard pounded together; which is of a very pleaſant ſmell, and of equal efficacy.

All that I have ſaid on this ſubject may be found in the Philoſophical Tranſactions [c]. For in the year 1687, Dr. Giovanni Coſimo Bonomo, an ingenious phyſician, publiſhed a letter written by him in Italian to the celebrated Redi of Florence, concerning the worms of the human body; wherein he fully handles the ſubject, and gives the figures of theſe worms and their eggs. And when I was upon my travels in Italy ten years afterwards, having got a copy of the letter, I made an abſtract of it in Engliſh, and upon my return communicated it to the royal ſociety.

C H A P. XV.

Of ſcrophulous diſeaſes.

THOSE hard ſwellings of the glands, which the Latins named ſtrumæ, the Greeks χοιράδες, and we the king's evil, are very obſtinate, and often perplex the phyſician; as they ſometimes bring on a fever, and never maturate kindly: and whatever way they are treated in order to open and cicatrize them, they generally break out again near the old ſcars. Their moſt common ſeat is in the neck, and in the arm-pits and groin, eſpecially in children; but ſometimes they appear on the thorax, and on the breaſts of women. Moreover, the humour often falls on the lungs, and brings on a pulmonary conſumption; and indeed, that diſeaſe is generally owing to a ſcrophulous cauſe in this and other northern countries at leaſt. And it is a dreadful circumſtance, of the evil, that it is tranſmitted from parents to their children by way of inheritance, which it does not eaſily give up.

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[c] N° 283.

As to the cure of this ſtubborn diſeaſe, it is to be attempted by bleeding, purging, and ſuch medicines as are moſt proper for correcting the viſcidity, ſaltneſs, and acrimony of the humours. Of catharticks, the beſt is dulcified mercury ſix times ſublimed, which ſhould be joined with rhubarb for children; but to adults it may be given alone, with a gentle purging draught ſome hours after it. The next to this in virtue is jalap. And our purging waters are alſo uſeful, as they ſcour the glands, and open the body at the ſame time. In fine, a pill compoſed of mercury ſix times ſublimed, and precipitated ſulphur of antimony, each one grain; of aloes, three or four grains, made up with the ſyrup of balſam, and taken every night, will be found ſerviceable not only in this diſeaſe, but in others ariſing from viſcid humours.

The medicines, which correct this pravity of the blood and humours, are, for the moſt part, of the diuretick kind; ſuch as burnt-ſponge, the diuretick ſalt, and vitriolated tartar; which are the more proper, becauſe they are ſomewhat laxative. To theſe may be added, the leſs compound lime-water. For my part, I have very often experienced the good effects of the following powder, taken twice a day, with three or four glaſſes of the aforeſaid water.

> Take of burnt-ſponge, one ſcruple; of purified nitre, coralline, and white ſugar, each ten grains; mix.

And if the patient happen to be emaciated, equal parts of milk may be mixt with the water. Millepedes will alſo be of ſome ſervice upon account of their diuretick quality, eſpecially the expreſſed juice thus prepared.

> Take live millepedes, pound them with a little powder of nutmeg; infuſe the maſs in ſmall wine; then ſtrain off the liquor by expreſſion, and ſweeten it with honey, or ſugar.

As to the patient's diet, which ought not to be neglected, let him feed on fleſh of eaſy digeſtion, and freſh-water fiſh, eſpecially of the ſhell-kind. Let him abſtain from all ſalt meats and high ſeaſoned things. Let him drink river-water, and that boiled; but well, or other ſtagnating water never, and leaſt of all ſnow-water. For we obſerve, that the inhabitants of mountainous places, the Alps eſpecially are naturally afflicted with ſwellings of the glands of the throat:

Qui

Quis tumidum guttur miratur in Alpibus[a]*?*

Iſſues are likewiſe beneficial to drain off the vicious humour; and a change of climate is often attended with good effects; eſpecially, if there be reaſon to apprehend the humour falling on the lungs: but the patient ſhould be ſent to a moderate climate, not ſubject to great viciſſitudes of heat and cold.

Laſtly, it is to be noted, that this diſeaſe, notwithſtanding its ſtubbornneſs, ſometimes entirely wears off, in young folks eſpecially, without any medicinal aſſiſtance, by alterations in the habit of the body, which time and growth occaſion: and I am of opinion, that this circumſtance firſt gave birth to the cuſtom of the royal-touch. For when crafty men obſerved, that the evil was of this nature, they eaſily imagined, that they would pleaſe their kings, in perſuading them to make this experiment of their power, and to introduce it with ſolemn rites and prayers; whereby they might acquire reverence from their ſubjects, and convince them that they held their crowns by divine right. And it is not matter of wonder, if the princes took the bait, and ſometimes believed that they were endowed with this gift from heaven; ſince according to the poet:

——Nihil eſt, quod credere de ſe
Non poſſit, cum laudatur dîs æqua poteſtas[b].

Moreover, the world is willing to be deceived; and the experiment ſometimes ſucceeded, though the ſucceſs might probably be owing in a great meaſure to the force of imagination, which acts very powerfully in the cure of diſeaſes. Hence our kings (unleſs when a prince of more than ordinary wiſdom filled the throne) have for a long time conferred this favour on the credulous multitude with great humanity. But the French boaſt, that their kings had received this heavenly gift long before our monarchs.

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[a] Juvenal Sat. xiii. ver. 162.

[b] Ibid. iv. ver. 70.

CHAP. XVI.

Of the SCURVY.

THE name of Scurvy is given by medical writers to a diſeaſe ſo various and different in appearance, that it does not ſeem to be one and the ſame diſtemper. In the northern countries it has always been common, and the nearer they are to the ſea, the more ſevere it proves; accordingly the Danes, Norwegians, and other inhabitants of the coaſts of the Baltick are vaſtly afflicted with it; nor do the Germans, Dutch, or our own countrymen eſcape its fury [a].

It begins by foul ulcers in the mouth and legs; whence it is called ſtomacace and ſceletyrbe by Pliny, who imputes it to the bad qualities of water, and ſays, that the herba Britannica (which is believed to be the hydrolapathum nigrum of Muntingius, or great water-dock) was found to be its cure [b]. But the diſeaſe was known long before Pliny's time: for Hippocrates deſcribes it by the name of *σπλῆν μέγας*, or great ſpleen; and ſays likewiſe, that it ariſes from drinking cold, crude, turbid waters [c].

I remember to have formerly ſeen in St. Thomas's hoſpital an inſtance of this caſe in a country-fellow of the Iſle of Sheppey, which place is notorious for moiſt, thick air, and unwholeſome water. When the Roman army, under the command of Claudius, landed in Britain, and the troops were ſtationed in the above-mentioned iſland and places adjacent, they there contracted this diſeaſe; and it is not improbable, that, ſome of the natives ſhewed them the herb, which Pliny ſays was of ſervice to them, and that the Romans gave it the name of herba Britannica from the country. For it is well known, that that emperor embarked his army for that expedition at Boulogne, which is directly oppoſite to Kent [d]. Strabo relates a ſimilar ſtory of the Roman army, which Auguſtus ſent into Arabia under the command of Ælius Galſus. For he ſays, that while they were at Albus Pagus, the ſoldiers were ſeized with diſorders of the mouth and legs, called ſtomacace and ſceletyrbe, which are endemick in that country, and are a ſort of relaxation, proceeding from the waters and vegetables [e]. Now to me it is very plain, that the unwholeſome ſea-air, bad diet, and worſe water, rendered that climate ſubject to thoſe diſorders; for Ptolemy, in his Geography, places Albus Pagus on the coaſt of the Sinus Arabicus or Red-Sea. But to return from this digreſſion: the poor patient above-mentioned had an irregular, intermitting fever, with a bad habit of body; and likewiſe an ill-natured ulcer in each of his legs. By the uſe of medicines, proper in the Scurvy, I mean bitters and diureticks, he ſeemed to grow better; for one of the ulcers was by chirurgical applications entirely healed; but while the other was under cure, a gangrene ſeized the part unexpectedly, which being ſcarified in order to check its progreſs, the patient died ſuddenly. Upon opening the abdomen, we were ſtruck with amazement at the monſtrous ſize of the ſpleen. For it weighed five pounds and a quarter; whereas the liver weighed but four pounds and a quarter. But its bulk ſeemed to be its only defect; for it retained its natural ſhape and colour, and had not the leaſt ſcirrhoſity or other hardneſs: and its inſide was, as uſual, of a dark livid hue, with lax fibres, and deep coloured blood.

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[a] See Eugalenus de ſcorbuto, and Sennertus, Lib. iii. part v.

[b] Nat. hiſt. Lib. xxv. ſect. vi.

[c] See De internis affect. ſect. xxxiv. and De aëribus, locis, & aquis, ſect. x.

[d] See Suetonius in the life of Claudius, chap. xvii.

From the above-mentioned ulcers the breath becomes offenſive, the gums are corrupted, and turn livid, and ſometimes blackiſh; and upon preſſing them lightly with the finger they emit a duſky gore. Beſides, they are ſo lax and flabby, that they quit their hold of the teeth; and theſe are ſometimes ſo looſe, that they may be all pulled out with great eaſe. In the mean time, greeniſh and livid ſpots, like the remains of ecchymoſes, appear on various parts of the body, as on the arms, buttocks, thighs, legs, and frequently all over the ſkin, ſo as to make it have the appearance of a jaundice. The patient is alſo tortured with ſevere gripings. And from this ſymptom it is, that the diſeaſe has obtained its name, being derived from the Saxon word ſcorbock or ſchorbuck, which ſignifies tearings of the belly.

Beſides unwholeſome waters, medical writers attribute the diſeaſe partly to ſalted proviſions and pulſe; which, as they are of difficult concoction, furniſh the body with groſs and improper nutriment. But they ſeemed not to have ſufficiently attended to a more univerſal cauſe, I mean, bad air, which taken into the lungs is very prejudicial. This is particularly manifeſt in long voyages, in which the ſailors are moſt ſeverely afflicted with this diſtemper. Whereof we have a remarkable, and moving account, in the hiſtory of Lord Anſon's expedition to the South Seas; in which that great commander loſt near a third part of his men by this cruel enemy; and the calamity roſe to ſuch a high pitch, that the callous of broken bones, which had been completely formed for a long time, was found diſſolved, and the fracture ſeemed as if it had never been conſolidated [f]. Wherefore, in theſe caſes, there certainly muſt be a high degree of corruption of the bodily humours, and even a degree of putrefaction: and the blood becomes ſo foul a mixture, that whence-ſoever it be drawn, it has nothing of its natural red colour, but reſembles a dark, muddy puddle. Now, as to the manner, in which the cauſes above-mentioned corrupt and putrefy the humours, it will be eaſily found by thoſe who are well acquainted with the properties and laws of motion in the animal machine: which I need not dwell on in this place, becauſe I have pretty amply treated of them in a tract before-mentioned, in which I demonſtrated the uſefulneſs of Mr. Sutton's machine for extracting foul air out of ſhips, and other cloſe places [g].

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[e] *Στομακάκη τὲ καὶ σκελοτύρβη πειραζομένης τῆς στρατιᾶς ἐπιχωρίοις πάθεσί, τῶν μὲν περὶ τὸ στόμα, τῶν δὲ περὶ τὰ σκέλη παράλυσίν τινα δηλούντων, ἔκ τε τῶν ὑδρείων, καὶ τῶν βοτανῶν.* Geograph. Lib. xvi. pag. 781. ed. Pariſ. 1620.

With regard to the cure, it is much eaſier to prevent the Scurvy than to remove it; for when it has once taken root in the body, it is very difficult to drive it out by medicines. Now its beſt remedy is good wholeſome air, and proper diet. Wherefore, as ſoon as a perſon is taken ill, if he be at ſea, he ought to alter his ſituation as ſoon as poſſible, and get on ſhore, to breathe the land air; but if on land, he ſhould go into the country for the benefit of purer, open air. And in both caſes, what fleſh he eats ſhould be freſh and tender; but the greateſt part of his food ought to be vegetables, both ſuch as abound in a volatile ſalt, as ſcurvy-graſs, creſſes, brook-lime, and the like; and thoſe which are of a cooling nature, as ſorrel, endive, lettuce, purſlain, and others of this kind. And it will often be beneficial to eat all theſe, or ſome of each ſort promiſcuouſly together. But the greateſt ſervice may be expected from ſubacid fruits, as lemons, oranges, and pomegranates, eaten frequently, upon account of their cooling and ſubaſtringent quality.

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[f] See Anſon's Voyage round the world. Lond. 1748.

[g] Diſcourſe on the Scurvy, annexed to Sutton's hiſtorical account of a new method for extracting the foul air out of ſhips, &c. Lond. 1749.

But I recommend to the reader the peruſal of the above-mentioned voyage, which is written in a clear and elegant ſtyle, and, beſides, various intereſting incidents, which muſt give pleaſure to all orders of men, contains many things proper phyſicians to know. Nor will he perhaps repent his trouble, in turning over what I wrote on this diſeaſe in the tract, wherein I explained the uſefulneſs of Mr. Sutton's machine. There he will find a remarkable caſe of a Dutch ſailor on board one of the Greenland ſhips, who was ſo waſted and diſabled by the Scurvy, that he was put on ſhore in Greenland, and abandoned to his fate: and yet by feeding on ſcurvy-graſs (or rather grazing on it; for he had loſt the uſe of his limbs, and crawled about on his hands and knees) he was perfectly cured, and was found the enſuing ſeaſon on the iſland, and brought home in health and vigour.

But it is time to cloſe this chapter; which I do, by recommending Mynſicht's elixir of vitriol, taken in cold water at proper intervals, and ſometimes the ſtyptick tincture, taken in the ſame manner, as very good medicines for checking hemorrhages, which are not uncommon in this diſeaſe.

CHAP. XVII.

Of the hypochrondriacal diſeaſe.

THE hypochondriacal diſeaſe is an indiſpoſition of the whole body, and not of any particular part; and yet the abdominal viſcera, viz. the ſtomach and inteſtines, the liver, ſpleen, pancreas and meſentery, are chiefly affected in it, according to the peculiar nature of each of them. The ſtomach is diſordered with frequent ructus and flatulencies, the ſigns of crudities. The liver is ſwelled with thick, viſcid bile, obſtructing its ducts. When the ſpleen is affected, the function of which ſeems to be, to convey a very fluid blood through its arteries, partly into its own cells, and partly into the ſplenick vein, for the uſes of the liver; this blood grows ſo thick as almoſt to ſtagnate in that vein, whereby this ſoft organ is tumefied and diſtended. If the pancreas be affected, the glands, which ſecrete the pancreatick juice, grow ſcirrhous in ſome degree, and perform their office too ſparingly: hence the bile, which mixes with it in the inteſtines, is not ſufficiently diluted; and the chyle being too thick, paſſes with difficulty through the lacteals, and in ſome meaſure ſtagnates in its paſſage. When the omentum is diſordered in this diſeaſe, the thin ſubtile oil, which is collected in its cellules, in order to be conveyed to the liver, and there to be mixed with the blood brought thither from the ſpleen, paſſes in leſſer quantities than uſual; whereby the blood in the vena portarum is not rendered thin and fluid enough. In fine, the conſequence of the meſentery being affected is, that through the obſtruction of its glands, and ſubſequent deficiency of the lymph, which they ought to ſecrete for the dilution of the chyle, this liquor becomes too thick, and leſs proper for nutrition. Hence it manifeſtly appears, that in this diſeaſe the blood and humours grow thick and ſluggiſh, and are rendered unfit for their reſpective motions, and the uſes of life.

This diſeaſe, ſo various in appearance, is chiefly owing to two cauſes, reſt of body, and agitations of mind: by the former, the humours are rendered too ſluggiſh in their motions; and by the latter, the blood at one time almoſt ſtagnates, and at another, is driven on with exceſſive vehemence; and health muſt ſuffer in both caſes.

This theory plainly points out the cure, which conſiſts in purging off and correcting the humours. Yet the diſeaſe does not require ſtrong catharticks; it is much ſafer to truſt to the milder ſort, ſuch eſpecially as attenuate the humours, and work by ſtool and urine at the ſame time. Of this kind are the deobſtruent pills, aloeticks, blended with ſaponaceous medicines, rhubarb, Glauber's ſalt, and the like.

The lentor and thickneſs of the humours are moſt conveniently removed by chalybeates, bitters, and aromaticks, eſpecially in tinctures. And natural chalybeate waters are the moſt efficacious of all ſteel medicines.

In fine, all ſorts of bodily exerciſe are neceſſary; and in particular, it will be of great ſervice to play at bowls or tennis, to toſs the arms briſkly to and fro with lead weights, graſped in the hands; but nothing is better than riding daily on horſeback.

I finiſh with a ſhort ſtory which may ſeem ridiculous, but is true, and ſhews the whimſicalneſs, if I may uſe the expreſſion, of this diſeaſe. A certain fellow of a college, by too much indulging a ſedentary life, was ſo ſeverely afflicted with this diſorder, that he was at length obliged to take to his bed; and his hypochondriaciſm gradually roſe to that pitch, that he declared himſelf at the point of death. In that fit, he ordered his paſſing knell to be rung in a church not far from his chambers; which was accordingly done; but in ſo bungling a manner in his opinion, (for he had been a famous ringer in his younger days) that in a violent paſſion he jumped out of bed, ran to the church, chid the ſexton, and told him he would ſhew him the true way of ringing. Whereupon he graſped the rope, and fell to work with ſuch vehemence, that he ſoon wrought himſelf into a muck ſweat; then returned to bed in order to die contented. But he was diſappointed, for the exerciſe reſtored him to life and health. Thus, as Hippocrates formerly obſerved [a], contraries are the remedies of contraries.

CHAP. XVIII.

Of the affections of the mind.

THE affections of the mind, commonly called paſſions, when vehement and immoderate, may be juſtly ranked among diſeaſes; becauſe they diſorder the body various ways. The fact is indiſputable; but in order to account for the manner in which it is brought about, it is neceſſary to have a clear and diſtinct notion of the nature of the ſoul, and the law of its union with the body; a point of knowledge, to which, in my opinion, we ſhall never attain in this life. For ſuch is the condition of our exiſtence, that though we have it in our power to exert the faculties of our mind and our bodily ſtrength with ſurpriſing promptitude; yet we are groſsly ignorant of the manner and principle of all our actions, the knowledge of which ſeems quite unneceſſary for leading a good and happy life.

However, we can eaſily perceive the effects of the commotions of the mind on our corporeal frame; nor is it any ways difficult to diſcern the alterations, which they occaſion in the blood and humours. For ſome of them retard, others accelerate the motion of the circulating fluid; while others again act as checks and ſpurs alternately. Thus grief and fear ſlacken its pace; anger, indignation, and intemperate luſt, drive it on a full gallop: and a combination of theſe and the like commotions produces precipitate and ſudden viciſſitudes of ſlowneſs and quickneſs. And it may not be amiſs to obſerve, that inordinate affections, dwelling long on the mind, frequently become tedious diſeaſes, according to their reſpective natures. So anxiety, deſpair, and grief cauſe melancholy; and anger ends in fury and madneſs. But the paſſions do not act with equal force on all individuals: their effect varies according to the diverſity of conſtitutions both of mind and body; and even in the ſame individual, the diſturbances, which they raiſe, are different at different times. So thoroughly incomprehenſible is the conſtruction of our fabrick.

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[a] Τὰ ἐναντία τῶν ἐναντίων ἐστὶν ἰήματα De flatibus. ſect. iii.

But there is another very wonderful circumſtance, which I do not find recorded by any any other medical writer but Aretæus [a]. For it is not only true, as he obſerves, that the affections of the mind bring on bodily diſeaſes; but theſe diſeaſes likewiſe in their turn engender paſſions, and ſuch ſometimes as ſeem quite contrary to the nature of the diſeaſe. And this he exemplifies in a dropſy, which, though it be a moſt pernicious diſeaſe, yet inſpires the ſick with courage and patience; not from any alacrity, or good hopes, as happens to thoſe who are in proſperity, but from the very nature of the diſeaſe. A fact, ſays he, which we can only admire, without being able to diſcover its cauſe.

But all thoſe things are performed by the intervention of the animal ſpirits, which make that great engine of the blood's motion, the heart, contract with leſſer or greater force. Wherefore the pulſe diſcovers thoſe alterations even in their very beginning.

But before I come to the medical treatment of the diſorders of the mind, it may not be improper to take notice, that the omnipotent Creator has given us theſe natural commotions for very wiſe ends; which ſeem to be, that thereby we may be urged with a kind of impetuoſity to ſhun evil, and embrace good. Wherefore the paſſions are not bad in themſelves; it is their exceſs that becomes vicious, when they riſe to ſuch an extravagant pitch, as not to be governed by the dictates of reaſon.

Now, to aſſwage theſe ſwelling ſurges of the ſoul, is the buſineſs of philoſophy. But, alas! in this point all the precepts of the very Stoicks, commonly prove ineffectual; for the followers of this ſect, frequently ſpeak mighty things, but live not up to their doctrine;

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[a] De cauſis & ſignis diuturnorum morborum, Lib. ii. cap. 1.

Naturam expellas furcâ licet, uſque recurret.

Nature expell'd by force reſumes her courſe.

However, we ought to uſe our beſt endeavours; for the more difficult the conflict, the more glorious will be the victory. It will poſſibly be ſaid by ſome, that a phyſician ſhould confine himſelf to the cure of bodily diſtempers, and leave theſe moral points to be controverted and ſettled by philoſophers. Now, whatever force this advice may have in other caſes, this before us, ſeems to me of ſuch moment, that I beg to be indulged in the liberty I take, of interſperſing this medical work with ſome few incentives to virtue, which I have learned in their ſchools.

Firſt then, we all have a natural propenſity to pleaſures; but theſe are of two very different ſorts, the ſenſual and the mental. Senſual pleaſures engroſs the greateſt part of mankind; while thoſe few only, quos æquus amavit Jupiter, are taken with the beauties of the mental. And the reaſon why ſo many run after pleaſures of the firſt ſort ſeems to be; becauſe they hardly ever allow themſelves an opportunity of taſting the ſweets of an upright conſcience, or of feeling that joy, which ariſes to a good man, from the moderation of his irregular deſires; and being entirely devoted to the gratification of their ſenſual appetites, they never give the leaſt attention to the real charms of virtue. Wherefore whoſoever deſires to enjoy this ſolid happineſs, ought to inure himſelf by degrees to the love of virtue, and ever carefully to avoid adding fuel to the fire of his paſſions.

Appoſite to theſe ſentiments is that ſaying, which Cicero puts into the mouth of Cato, as by him received from the great Archytas of Tarentum; that nature never afflicted mankind with a more capital plague, than bodily pleaſure; the eager deſires of which ſpur on to enjoyment with ungovernable raſhneſs [b]. And the reſt of what that great philoſopher has written on this ſubject, muſt delight the mind of every wiſe man in the peruſal. Wherefore, virtue's exclamation in Silius Italicus, is very juſt:

Quippe nec ira deûm tantum, nec tela, nec hoſtes;
Quantum ſola noces, animis illapſa voluptas [c].

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[b] De ſenectute, cap. xii.

[c] Punicorum, Lib. xv. ver. 94

Pleaſure, by gliding on the minds of men,
More miſchiefs haſt thou wrought than hoſtile arms,
Than wrath of gods.

But as the due government of the paſſions ſtrengthens the mind, ſo temperance in diet renders the body leſs expoſed to theſe turbulent motions. And this rule holds good, not only in thoſe, who are naturally of a hot conſtitution, but even in thoſe, who curb their appetites; becauſe it keeps them in a ſtate of tranquillity.

And this is the way in general, to reſiſt theſe evils, or at leaſt to diminiſh their effects. But when they have taken deep root in the body, each of them requires its own proper remedies. In thoſe commotions, which check the courſe of the vital humours, ſpurs are neceſſary; but curbs, when they gallop too faſt. The ſtrong-ſmelling gums, caſtor, volatile ſalts, and ſpirits extracted from animals, and things of this kind, are very convenient ſtimuli. Blood-letting, keeping the body open, nitre, and all other coolers, reſtrain the impetuoſity of the blood. But it is of the utmoſt conſequence to frequent the company, and follow the advice of perſons of fortitude and wiſdom; for in every ſtage and ſtate of life, great is the power of example, whereby we inſenſibly learn to give ear to reaſon, and govern our paſſions; which, unleſs brought into intire ſubjection, will become our tyrants.

But as for thoſe, who would have us to be entirely devoid of paſſions, and to ſuppreſs all the affections of the mind, as if they were ſo many evils; they certainly have a wrong notion of the wiſdom and goodneſs of the almighty Creator, who has inſerted, and, as it were, interwoven them into our frame for excellent purpoſes; for they are not only beneficial to individuals upon many occaſions, as I have already ſaid; but even neceſſary for keeping up ſociety and connections between mankind.

CHAP. XIX.

Of the diſeaſes of women.

ON the diſeaſes of women there ſeems to be the leſs neceſſity of ſaying much, becauſe a number of authors have taken vaſt pains in their deſcription and cure. Yet, to avoid the cenſure of neglecting that lovely ſex, I will briefly touch on a few points relating to their ailments; beginning by thoſe, which are often the conſequences of a ſingle life. Of theſe the moſt frequent is

SECTION I.

THE SUPPRESSION OF THE MENSTRUAL DISCHARGES.

The common cauſe of the ſtoppage of the menſtrual diſcharges is the blood's lentor; whereby this fluid becomes incapable of forcing the ſphincters of the ducts, deſtined by nature for this evacuation. For it is not from the burſted arteries of the uterus, which is the common opinion, that the blood iſſues every month, but from veſſels peculiarly appropriated to this office. And this lentor, or thickneſs of the blood, changes the lively colour of the face into a greeniſh pale and wan complexion.

The proper medicines in this diſtemper are thoſe, which are capable of encreaſing the blood's circulation, and attenuating the viſcid humours; and ſuch are all bitters, joined with aromaticks, as alſo many preparations of ſteel. But to theſe ought to be premiſed blood-letting, and catharticks, blended with calomel. The tinctura ſacra is alſo an excellent medicine.

But of all the moſt powerful emmenagogues, I have found ſo ſingular a virtue in black hellebore, that I hardly remember it ever failed anſwering my expectations. My way of ordering it is, a tea-ſpoonful of tincture of black hellebore in a glaſs of warm water, to be taken twice a day. And I have obſerved this remarkable circumſtance; that whenever, either from a bad conformation of the parts, or any other cauſe, this medicine had not the deſired effect, the blood was forced out through ſome other paſſages; which is a manifeſt proof of the great power of this medicine, in ſpurring the blood forward.

SECTION II.

THE EXCESS OF THE MENSTRUAL DISCHARGES.

But likewiſe the menſtrual diſcharges frequently run to exceſs. In that caſe, the flux is to be reſtrained: which, after letting blood, is effected both by thoſe medicines, which condenſe and inſpiſſate the blood; and by thoſe, which allay its heat. Of the firſt ſort, the principal are ſuch as participate of vitriol or alum; eſpecially the tincture of roſes; or a powder, compoſed of alum three parts, and dragon's blood one part, melted together. But the heat of the blood, and its conſequence, the flux, is more powerfully checked by the Peruvian bark, than by any other medicines whatſoever.

SECTION III.

THE FLUOR ALBUS.

The Fluor Albus is a diſcharge of a whitiſh, gleety matter, by the natural parts of the ſex. This humour iſſues ſometimes from the veſſels of the uterus, and ſometimes from the glands of the vagina. In the former caſe, this diſcharge is ſuppreſſed during the time of the menſtrual courſes; in the latter, it ſubſiſts with them, and continues even in the time of pregnancy.

In both ſpecies of the diſeaſe, the principal intention ought to be directed towards mending the habit of body, from ſome fault in which they derive their origin: but when the ſeat of the diſtemper is in the vagina, it will moreover require topical applications.

Wherefore, generally ſpeaking, it will be proper to begin the cure by giving a vomit, eſpecially with Ipecacoanha wine. Frequent purging is indicated chiefly with rhubarb; which may be taken either in ſubſtance, with the addition of aromaticks, and in ſome caſes, of a little calomel now and then; or in the tincture of rhubarb in wine. And the laxity of the fibres requires aſtringents, particularly ſuch as have ſteel in their compoſition.

As to external or topical remedies, which, I have ſaid, are neceſſary, when the vagina is the ſeat of the diſeaſe; we ought carefully to avoid applying all ſuch as are powerful repellers of the peccant humour; for thoſe only are ſerviceable, which deterge, and heal the little ulcers of that membrane. For my part, I have often, with great ſucceſs, ordered the patient to inject a ſmall quantity of Bates's aqua aluminoſa, or of the camphorated vitriolick water, with a little Egyptian honey added to either, into the vagina, through a proper ſyringe, at repeated times. And it will be of ſome ſervice to fumigate the vagina now and then with a powder, made of equal parts of frankincenſe, maſtich, amber, and cinnabar of antimony, thrown on burning coals.

SECTION IV.

THE HYSTERICAL DISEASE.

There is no diſeaſe ſo vexatious to women as that called hyſterical. It is common to maids, wives and widows; and although it may not be attended with great danger, yet it is frequently very terrifying: and moreover, it ſometimes deprives them of their ſenſes as effectually, as if they had been ſeized with an epileptick fit.

When a woman has fallen into a hyſterical fit, blood-letting will be of uſe, if ſhe has ſtrength to bear it; if not, cupping-glaſſes are to be applied to her groins and hips. But if ſhe continues long in it, it will be proper to put the ſnuff of a candle, or ſome other thing of a fœtid ſmell to her noſtrils, in order to rouze her. In the mean time, her thighs and legs ought to be rubbed.

When ſhe is recovered from the fit, proper means muſt be uſed to prevent a relapſe. If ſhe be liable to obſtructions, and not regular, the menſtrual diſcharges are to be promoted. The ſtrong-ſmelling gums and ſteel medicines are very ſerviceable: and it is benefical to uſe exerciſe. But the diſturbances of the mind generally require proper remedies.

In fine, Hippocrates after preſcribing caſtor, and many other medicines, wiſely ſays, that a woman's beſt remedy is to marry, and bear children [a].

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[a] Ἄριστον δὲ ἐν γαστρὶ ἔχειν· τὴν δὲ παρθένον πείθειν ξυνοικέειν ἀνδρί. De morbis mulierum, Lib. ii. ſect. 19.

SECTION V.

DIFFICULT BIRTH.

Humanity prompts us to give what aſſiſtance we can, beſides the manual operation, to the ſex in hard labour. For although provident nature has taken ſuch good care for the propagation of the human ſpecies, that the labour-pains are ſeldom attended with much danger ; yet it ſometimes happens, that the birth is very difficult and tedious. And this difficulty proceeds from many different cauſes, with which thoſe who are truly ſkilful in the obſtetrical art, are not unacquainted, and therefore they manage accordingly. But there is one caſe, in which they are often at a loſs what to do ; and that is, when the lying in woman is long teized with falſe pains, reſembling thoſe of the colick. When this happens, it is proper to give a grain or two of opium ; whereby thoſe pains, which rather hinder than promote the delivery, are appeaſed ; and then nature, thus relieved, does her work effectually. It is likewiſe of ſome moment in this caſe to know, that the opiate relaxes and opens the uterine parts, as it does all others that are in a ſtate of conſtriction or tenſion.

CHAP. XX.

Of VENEREAL DISEASES.

THE venereal infection, that bitter ſcourge of unlawful embraces, would have proved the reproach of phyſicians ; had not quickſilver been happily found to be its antidote.

The nature, hiſtory, and progreſs of the diſeaſe have been ſo amply and elegantly deſcribed by the learned Aſtruc [a], that nothing more can be required on that head. But as to the manner, in which this ponderous fluid operates in the body, I think I have clearly explained it in another place [b], with ſome neceſſary cautions annexed. Wherefore the only thing now remaining is, to make a few remarks on a diſorder or two, which are the conſequences, either of the diſeaſe itſelf, or of a bad cure.

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[a] De morbis venereis. Paris, 1740.

[b] Eſſays on Poiſons, 1747. Eſſay iv.

And firſt, that diſcharge of a mucous humour, commonly called a gleet, which ſometimes ſucceeds a virulent gonorrhœa, is very troubleſome and obſtinate. It proceeds both from the veſiculæ ſeminales and the proſtate gland, by the eroſion of the orifices of their ducts, from the acrimony of the morbid humour; and is moſt commonly the reſult of an ill-judged method of curing the gonorrhœa, with violent catharticks, which deſtroy the natural tone of the fibres.

Nothing is more common among practitioners in this caſe, than to adminiſter balſamicks, with a view of ſtrengthening the parts; but generally without ſucceſs. It has been my practice for many years paſt to order the following tincture; and as I found it very efficacious, I have recommended it to a number of phyſicians and ſurgeons.

> Take of rhubarb three drachms; of gum guaiacum, a drachm and a half; of ſhell-lake, a drachm; of cantharides bruiſed, two drachms; of cochineal, half a drachm: infuſe theſe ingredients in a pint and half of rectified ſpirits of wine, and ſtrain off.

Of this let the patient take from thirty to fifty drops (that is, as much as can be given without danger of bringing on a ſtrangury) morning and night, in a glaſs of warm water.

A hectick fever is now and then the conſequence of a long ſalivation. In this caſe a decoction of the woods of guaiacum and ſaſſafras, and the roots of china and ſarſaparilla, with a little liquorice, and coriander ſeeds, is to be drank plentifully, mixed with milk. And the patient ſhould continue this courſe, till he has recovered ſtrength and fleſh.

Laſtly, it may not be amiſs to admoniſh, that the moſt proper time for ordering a ſalivation is, when either pocky eruptions have for ſome time appeared on the body, or ulcers, eſpecially in the mouth and throat; and the bones are not yet become carious. For when they are actually foul, there is reaſon to apprehend, that their lamellæ may be broke aſunder by the ponderoſity of the mercurial globules. Wherefore, it is ſafer to protract the cure by a more ſparing uſe of this medicine, than to hurry it on by a contrary practice.

CHAP. XXI.

Of diſeaſes which come upon, or are changed into others.

IT is of great moment, both for the benefit of the patient, and the honour of the phyſician, to know what diſeaſes come upon, or are changed into, others. Wherefore I will briefly mention ſome of theſe.

Authors indeed have raiſed great diſputes on the cauſes of theſe changes: but they are certainly different according to the nature of the reſpective diſeaſes. For ſometimes the conſent, and a certain affinity of the affected parts with others not yet affected, cauſe the diſeaſe to paſs from the former to the latter. More frequently the vicinity of the parts makes the evil to ſpread from one to another. But moſt commonly ſuch is the nature of the diſeaſe, that it terminates in another, either by way of criſis, or through the foulneſs of the habit. Out of a number of examples, which I could produce, I ſhall ſelect ſome few.

Through the conſent of the head and ſtomack, when this is loaded with phlegm, that is ſeized with giddineſs; and on the other hand, the repletion or other injury of the brain is attended with a ſickneſs at ſtomach. Through a ſimilar affinity between the liver and inteſtines, colick pains are often ſucceeded by a jaundice; and a jaundice ſometimes occaſions a colick, by pouring ſharp bile into the guts. And ſuch is the connection of the uterus with many other parts, that Hippocrates pronounced this organ to be the cauſe of all diſeaſes in women[a]. Now theſe parts are chiefly the head, lungs, and ſtomach; and the inſtruments of this ſympathy are the animal ſpirits, which, being hurried by the paſſions, either convey the diſorders of the womb to the reſt of the body, or communicate the diſtempers of the body to that organ.

The vicinity of the parts, which I have alledged as another cauſe of the ſucceſſion of diſeaſes, takes place chiefly in inflammations, by the tranſlation of the humour to the adjacent part. Thus a pleuriſy becomes a peripneumony; the iliack paſſion ſupervenes a ſtrangury; the diſorders of the kidneys ſpread to the loins; and the pains in the loins are communicated to the kidneys.

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[a] De morbis mulierum, Lib. ii.

In fine, the third cauſe which I have aſſigned for the ſupervention or tranſition of diſeaſes, is the very nature of theſe diſeaſes; which as it is various, ſo it produces its effect various ways. The gout ſometimes turns into the colick, and the colick into the gout. Varicoſe ſwellings of the veins, ſupervening pains in the joints, indicate the diſtemper going off. An apoplexy is ſucceeded by a palſy; and this paralytick ſeizure of the nerves, whether of the whole body, or of ſome particular part, is the criſis of the apoplectick fit. But if from the paralytick limbs, the diſorder returns to the head, death is generally the phyſician. Difficulty of breathing, of long continuance, gives riſe to a dropſy in the breaſt, as well as in the belly. An anaſarca affords great reaſon to apprehend an aſcites: and melancholy of long ſtanding is frequently ſucceeded by an epilepſy, which is hardly within the power of art to remove.

Hippocrates collected a great number of obſervations to this purpoſe, and upon them built the divine art of prognoſtick in diſeaſes, to which I refer my readers. Wherefore I quit the ſubject with this admonition, that although the cauſes, which I have enumerated, often exert their power ſingly; yet it commonly happens, that more than one of them concur in effecting thoſe ſucceſſions and tranſitions of diſeaſes.

CONCLUSION.

Of the regimen of life.

I HOPE it will not be thought inconſiſtent with the ſcope of this treatiſe on the diſeaſes of the human body, to ſubjoin, by way of Concluſion, ſome ſhort rules for the management of perſons in health through the different ſtages of life. Although indeed this taſk ſeems to be rendered almoſt ſuperfluous by the precepts delivered by Celſus[a]: which, whoſoever will obſerve, with due regard to the difference of climates, and manner of living now, and in the time of that wiſe author; moſt certainly, to uſe his own words, will not in good health ſquander the reſources of infirmities[b].

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[a] Lib. i. cap. 1, 2, 3.

[b] In ſecunda valetudine adverſæ præſidia non conſumet.

For ſuch is the natural conſtitution of the body of man, that it can eaſily bear ſome changes and irregularities without much injury: had it been otherwiſe, we ſhould be almoſt conſtantly put out of order by every ſlight cauſe. This advantage ariſes from thoſe wonderful communications of the inward parts, whereby, when one part is affected, another comes immediately to its relief. Thus, when the body is too full and overloaded, nature cauſes evacuations through ſome of the outlets. And for this reaſon it is, that diſeaſes from inanition, are generally more dangerous than from repletion; becauſe we can more expeditiouſly diminiſh than encreaſe the juices of the body. Upon the ſame account alſo, though temperance be beneficial to all men, the antient phyſicians adviſed perſons in good health, and their own maſters, to indulge a little now and then, by eating and drinking more plentifully than uſual. But of the two, intemperance in drinking is ſafer than in eating. And if a perſon has committed exceſs in the latter, cold water drank upon a full ſtomach will help digeſtion; to which it will be of ſervice to add lemon-juice, or elixir of vitriol, if he has eaten high-ſeaſoned things, rich ſauces, &c. Then let him ſit up for ſome little time, and afterwards ſleep. But if a man happens to be obliged to faſt, he ought to avoid all laborious work. From ſatiety it is not proper to paſs directly to ſharp hunger, nor from hunger to ſatiety: neither will it be ſafe to indulge abſolute reſt immediately after exceſſive labour, nor ſuddenly fall to hard work after long idleneſs. In a word therefore, all changes in the way of living ſhould be made by degrees.

It is alſo beneficial to vary the ſcenes of life; to be ſometimes in the country, ſometimes in town; to go to ſea, to hunt, to be at reſt now and then, but more frequently to uſe exerciſe: becauſe inaction renders the body weak and liſtleſs, and labour ſtrengthens it. But a mean is to be obſerved in all theſe things, and too much fatigue to be avoided; for frequent and violent exerciſe over-powers the natural ſtrength, and waſtes the body; but moderate exerciſe ought always to be uſed before meals. Now, of all kinds of exerciſe, riding on horſeback is the moſt convenient; or, if the perſon be too weak to bear it, riding in a coach, or at leaſt in a litter: next follow fencing, playing at ball, running, walking But it is one of the inconveniencies of old age, that there is ſeldom ſufficient ſtrength for uſing bodily exerciſe, though it be extremely requiſite for health. Wherefore frictions with the fleſh-bruſh are neceſſary at this time of life, which ſhould be performed by the perſon himſelf, if poſſible ; if not, by his ſervants.

Sleep is the ſweet ſoother of cares, and reſtorer of ſtrength ; as it repairs and replaces the waſtes that are made by the labours and exerciſes of the day. But exceſſive ſleep has its inconveniencies ; for it blunts the ſenſes, and renders them leſs fit for the duties of life. The proper time for ſleep is the night, when darkneſs and ſilence invite and bring it on : day-ſleep is leſs refreſhing. Which rule, if it be proper for the multitude to obſerve ; much more is the obſervance of it neceſſary for perſons addicted to literary ſtudies, whoſe minds and bodies are more ſuſceptible of injuries.

The ſofter and milder kinds of aliment are proper for children, and for youths the ſtronger. Old people ought to leſſen the quantity of their food, and encreaſe that of their drink. But yet ſome allowance is to be made for cuſtom, eſpecially in the colder climates, like ours : for as in theſe the appetite is keener, ſo is the digeſtion better performed.

Phyſicians are agreed, that copulation,
When age adult and high brac'd nerves invite,
Should neither be immoderately deſir'd,
Nor dreaded to exceſs. The good old man
Is by his tame frigidity admoniſh'd,
Not to engage in the dull drudgery,
Miſtaken for enchanting ſcenes of pleaſure ;
Leſt thus he ſnap his feeble thread of life.
But what more baſe, more noxious to the body,
Than by the power of fancy to excite
Such lewd ideas of an abſent object,
As rouze the organs, form'd for nobler ends,
To ruſh into th' embraces of a phantom,
And do the deed of perſonal enjoyment !

In fine, this truth ought to be deeply imprinted on every mind, that this, and indeed all other,

Voluptates commendat rarior uſus.

Pleaſures are heighten'd by a ſparing uſe.

For my part, after mature conſideration, I am long ſince come to this way of thinking. That although pleaſures, riches, power, and other things, which are called the gifts of fortune, ſeem to be dealt out to mankind with too much partiality; yet, if we take in the whole compaſs of the matter, we ſhall find a greater degree of equality of thoſe things, which conſtitute real happineſs, than is generally imagined. People of low condition, for the moſt part enjoy the common advantages of life more commodiouſly than thoſe of the higheſt rank. Wholeſome food is acquired by moderate labour; which likewiſe mends the appetite and digeſtion: hence ſound ſleep, uninterrupted by gnawing cares, refreſhes the wearied limbs; a flock of healthy children fill the cottage; the ſons grow up robuſt, and execute the father's taſk, making his hoary locks ſit comfortable on him. How vaſtly inferior to theſe bleſſings are the vain delicacies of moſt perſons of affluent fortunes, which are cloſely attended with real evils. In order to get down their food, their ſtomachs require high ſauces, which heat and corrupt the blood, and render the body obnoxious to diſtempers: the debauches of the day diſturb their reſt by night: and in puniſhment for their vices, their ſons, the great ornament and ſupport of families, contract diſeaſes in their mother's womb; with which they are afflicted through the whole courſe of a languid life, which ſeldom reaches to old age. They are likewiſe frequently racked with anxieties for obtaining honours and ſplendid titles, ſo as to be deſpoiled of the comforts, which they might reap from their plentiful poſſeſſions, by the vain deſire of new acquiſitions. Wherefore

> ——— *Horum*
> *Semper ego optarim pauperrimus eſſe bonorum* [c].

> I always wiſh to be extremely poor
> In wealth like this.

But there is one great inconvenience more attending high living, that by over-loading the body, the faculties of the ſoul are clogged, and the paſſions ſet all on fire; whereas on the contrary, the ſlender and homely diet of the poor and laborious, neither oppreſſes the ſtrength of body, nor ſupplies the vices with fuel. Therefore, unleſs prudence be a conſtant attendant on opulence,

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[c] Horat. Satyr. i. ver. 78.

Vivitur exîguo melius.

'Tis better living on a ſlender fortune.

Nor is nature to be deemed an unjuſt ſtep-mother, but a moſt provident and beneficent parent.

Upon the whole, it behoves a wiſe man in every ſtage of life,

———*Servare modum, finemque tenere,*
Naturamque ſequi [d].

———To hold the golden mean,
To keep the end in view, and follow nature.

But whoſoever forms a right judgment of human nature, will certainly find, that as ſome men are vaſtly ſuperior to others in the endowments of the mind, and yet, a ſad reflection ! even the beſt minds are blended with ſome degree of depravity ; ſo the moſt healthy bodies are frequently afflicted with great infirmities : and theſe being the ſeeds of death, ought to put us in mind of the ſhortneſs of this life, and of the propriety of this expreſſion of Lucretius :

Vitaque mancupio nulli datur, omnibus uſu [e] ;

None have a right to life, all to its uſe.

And likewiſe that there is no abſurdity in this ſaying of Hippocrates :

Ὅλος ἄνθρωπος ἐκ γενετῆς νοῦσός ἐστι [f].

The whole man from his birth is a diſeaſe.

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[d] Lucan. Lib. ii. ver. 381. [e] Lib. iii. ver. 984. [f] Epiſt. ad Damaget.

MEDICA

SACRA.

PREFACE.

MY declining years having in a great meaſure releaſed me from thoſe medical fatigues, in which, for the publick good, (at leaſt as I hope) I have been employed about fifty years, I have determined to paſs the ſhort remains of life in ſuch a ſort of leiſure, as may prove neither diſagreeable to myſelf, nor uſeleſs to others. For good men are of opinion, that we muſt give an account even of our idle hours, and therefore thought it neceſſary, that they ſhould be always well ſpent.

Having from my earlieſt childhood entertained a ſtrong paſſion for learning, after I had choſen the art of medicine for my profeſſion, I ſtill never intermitted my literary ſtudies; to which I had recourſe from time to time, as to refreſhments ſtrengthening me in my daily labours, and charming my cares. Thus, among other ſubjects, I frequently read the holy ſcriptures, as becomes a chriſtian; and next to thoſe things which regard eternal life, and the doctrine of morality, I uſually gave particular attention to the hiſtories of diſeaſes, and the various ailments therein recorded; comparing thoſe with what I had learnt either from medical writers or my own experience. And this I did the more willingly, becauſe I had remarked that divines, through an unacquaintance with medicinal knowledge, frequently differed widely in their ſentiments; eſpecially on the ſubject of dæmoniacks cured by the power of our ſaviour Jeſus Chriſt. For it is the opinion of many, that theſe were really poſſeſſed with devils, and that his divine virtue ſhone forth in nothing more conſpicuous than in expelling them. I am very far from having the leaſt intention to undermine the foundations of the chriſtian doctrine, or to endeavour, by a perverſe interpretation of the ſacred oracles, to deſpoil the Son of God of his divinity, which he has demonſtrated by ſo many and great works performed contrary to the laws of nature. Truth ſtands no more in need of the patronage of error, than does a natural good complexion of paint. And it is certain, that the opinion which has been prevalent for many ages, of the power granted to devils, of torturing human bodies and minds, has been ſeveral ways made ſubſervient to the ſubtle deſigns of crafty men, to the very great detriment and ſhame of the chriſtian religion.

What ſenſible man can avoid juſtly deriding thoſe ſolemn ceremonies, practiſed by the Roman prieſts, in exorciſing, as they are fond of terming it, dæmoniacks: while proper perſons (hired and) taught to counterfeit certain geſtures and fits of fury, ſuch as are believed to be cauſed by evil ſpirits, pretend that they are freed from devils, and reſtored to their ſenſes by holy water, and certain prayers, as by inchantment. But theſe juggling tricks, how groſly ſoever they may impoſe on the eyes and minds of the ignorant multitude, not only ſcandalize, but alſo do a real injury to, men of greater penetration. For ſuch, ſeeing into the cheat, often ruſh headlong into impiety; and viewing all ſacred things in the ſame light, after they have learnt

Religionibus atque minis obſiſtere vatum [a]:

they advance farther, and by an abominable effort, endeavour thoroughly to root out of their minds all ſenſe and fear of the ſupreme deity. In which proceeding they act as if a perſon doubted of the exiſtence of the Indies, becauſe travellers relate many falſehoods and fictions concerning them. Hence it comes to paſs, that in countries too much given up to ſuperſtition, very many atheiſts are to be met with even among the learned, whom their learning and knowledge ought to ſecure from theſe errors. Therefore to be free from this folly, is the principal part of wiſdom; next to which, is not to corrupt truth with fictitious opinions.

And indeed it is frequently to me a matter of wonder, why our ſpiritual guides ſo ſtrenuouſly inſiſt on exhibiting devils on the ſtage, in order to make the divinity of Chriſt triumph over theſe infernal enemies. Is Chriſt's divine power leſs manifeſted by the cure of the moſt grievous diſeaſes, performed in an inſtant at his command; than by the expulſion of evil ſpirits out of the bodies of men? Certainly all the wonderful things done by him for the good of mankind, ſuch as reſtoring ſight to the blind, firmneſs and flexibility to relaxed or contracted nerves, calling the dead to life, changing the properties of the elements, and others of the ſame kind, are teſtimonies of the omnipotence of the Creator of the world, and demonſtrate the preſence of God; who alone commands all nature, and at his pleaſure changes and inverts the order of things eſtabliſhed by himſelf. Wherefore it cannot be doubted, that He, who has performed theſe things, had the devils ſubject to him, that they might not obſtruct his gracious reſolution of revealing the will of his Father to men, and correcting their depraved morals.

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[a] Lucret. Lib. i. ver. 110.

But to reſume the ſubject of dæmoniacks, the opinion, which I propoſe in this treatiſe, is not purely my own, but alſo of ſeveral other perſons, before me, eminent for piety and learning. And indeed among our own countrymen, it was in the laſt century defended in an excellent diſſertation, by that treaſure of ſacred knowledge, the reverend Joſeph Mead. Wherefore as I have the honour to be of the ſame family with him, and am the ſon of Matthew Mead, a very able divine, I always thought I might lay ſome claim to theſe ſtudies, by a kind of hereditary right.

I am not inſenſible of the difficulty of removing vulgar errors, eſpecially thoſe which relate to religion. For every body knows the power of education, in imprinting on the mind notions, which are hard to be effaced even in adult age. Children in the dark fear ghoſts and hobgoblins; and hence often quake with the ſame fear through the whole courſe of their lives. Why then do we admire, if we can hardly unlearn, and clear our minds of, ſome falſe notions, even when we are advancing to old age? Nor will this be deemed indeed a matter of little importance by him, who conſiders the ſerious evils, into which mankind are often led, by things that to ſome may appear trifling, as being nothing more than bugbears of children and women. My ſoul is ſeized with horror on recollecting, how many millions of innocent perſons have been condemned to the flames in various nations, ſince the birth of Chriſt, upon the bare ſuſpicion of witchcraft: while the very judges were perhaps either blinded by vain prejudices, or dreaded the incenſed populace, if they acquitted thoſe, whom the mob had previouſly adjudged guilty. Who would believe that any man in his right ſenſes could boaſt, as a matter of merit, that he had capitally condemned about nine hundred perſons for witchcraft, in the ſpace of fifteen years, in the ſole dutchy of Lorraine [b]? And yet from many hiſtories, which he relates of thoſe who ſuffered, it manifeſtly appears, that every individual of theſe criminals, had no compacts with devils, as they themſelves imagined, but were really mad, ſo as openly to confeſs that they had done ſuch feats as are impoſſible in the nature of things. But ſo it happens, that error generally begets ſuperſtition, and ſuperſtition cruelty. Wherefore I moſt heartily rejoice, that I have

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[b] See Nic. Remigii Dæmonolatreia.

lived to ſee all our laws relating to witchcraft entirely aboliſhed: whereas foreign ſtates ſtill retain this barbarous cruelty, and with various degrees of obſtinacy in proportion to their ignorance of natural cauſes. And it is but too true, that the doctrine of dæmons is ſo underſtood by the vulgar, as if the devil was to be eſteemed a ſort of deity; or at leaſt, that, laying the fear of him aſide, no divine worſhip can well ſubſiſt; although the apoſtle has expreſly ſaid; For this purpoſe the Son of God was manifeſted, that he might deſtroy the works of the devil [c].

And here it may not be improper, once for all, to inform the reader, that I have generally made uſe of Sebaſtian Caſtalio's verſion of the bible, becauſe, upon collating it in many places, I found it to be not only excellent Latin, but alſo very accurate, and particularly well adapted to the ſenſe and meaning of the words in the Hebrew and Greek.

Nor can I refrain from declaring, that I have not writ theſe eſſays for the profane or vulgar; but for thoſe only who are well verſed, or at leaſt initiated in theological or medical ſtudies: and for this reaſon I choſe to publiſh it in Latin; which language has for many ages paſt been made uſe of by learned men; in order to communicate to each other, whatſoever might ſeem to them either new, or expreſſed in a different manner from the common notions. Wherefore if any perſon ſhould intend to publiſh an Engliſh verſion of this book, I give him this timely notice, that he will do it, not only againſt my will; but likewiſe in direct oppoſition to that equitable law, whereby every man is allowed to diſpoſe of his own property according to his pleaſure [d].

But to bring this preface to a concluſion; it is manifeſt that the chriſtian religion requires of all its members in a moſt eſpecial manner, to practice every act of humanity and benevolence towards each other. Wherefore the utmoſt care ought to be taken, that this beneficent diſpoſition of mind be not corrupted by any means whatſoever: and nothing contributes more towards bringing on this corruption, than opinions derogatory from the divine goodneſs. Upon this account, as ſuch is the misfortune of our times, that it is not

[c] John Ep. i. Chap. iii. ver. 8.

[d] This declaration ſeems to have been intended only to prevent any ſurreptitious tranſlation of this performance from appearing, ſeeing moſt of the works of our learned author have heretofore been greatly diſgraced by attempts of that kind. Neverthelefs the publick may be aſſured, that Dr. Mead not only approved, but inſpected what is now offered to them.

only allowed, but even by many deemed a commendable action, to oppugn, and by every method to invalidate, the doctrine and authority of the chriſtian religion; no interpretations of the hiſtories of miracles ought to be looked upon as out of ſeaſon, provided they appear neither improbable, nor repugnant to the nature of the facts related.

In fine, it was not my intention to treat of every diſeaſe mentioned in holy writ; but to confine myſelf more particularly to thoſe, the nature of which is generally but little known, or at leaſt to ſuch as I had ſome peculiar medicine for, or method of cure, to offer to the publick; and to perform this taſk, in the ſame order, in which they occur in thoſe ſacred writings: excepting only Job's diſeaſe, to which I have given the firſt place, on account of the great antiquity of that book. The Saviour of the world, in order to make his divine power manifeſt to mankind, cured many other diſeaſes, both of the body and mind, beſides thoſe which I have mentioned in this work: the nature and cauſes of all which diſeaſes, whoſoever would intend to enquire into, muſt of neceſſity compile a body of phyſick, which was not my preſent deſign. But if providence protract my life, I am not without hopes of laying more of my thoughts on this ſubject before the publick, for the honour which I bear to my profeſſion, unleſs

Frigidus obſtiterit circum præcordia ſanguis.

In the mean time, whatever be the fate of theſe eſſays with my readers, I ſhall reſt ſatisfied from a conſciouſneſs of the rectitude of my intention, in having thus employed ſome of my hours of leiſure.

A COMMENTARY ON THE DISEASES mentioned in Scripture.

CHAP. I.

The diſeaſe of JOB.

JOB's diſeaſe is rendered remarkable by ſome uncommon circumſtances and conſequences; ſuch as the dignity of the man, the ſudden change of his condition, his extraordinary adverſity, his incredible patience under them, his reſtoration to a much happier ſtate than he had ever before enjoyed, and laſtly the ſingular nature of the illneſs with which he was ſeized.

His habitation was in the land of Uz, which, according to the learned Frederick Spanheim[a], was ſituated in the northern part of Arabia deſerta, towards the Euphrates and Meſopotamia. He was a very illuſtrious man, the moſt opulent of all the orientals, very happy in ſons and daughters, of a moſt upright life and exemplary piety. Now it is related that God, in order to try his integrity and conſtancy, permitted Satan to afflict him by all means which he could deviſe, except the taking away of his life. "In purſuance of this "permiſſion, Satan brought the moſt dreadful calamities on "him; for all his oxen and aſſes were driven away by the "Sabeans; his ſheep and ſervants were conſumed by fire from "heaven; his camels were carried off; his ſons and daugh-"ters were cruſhed to death by the falling in of the houſe

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[a] Hiſtor. Jobi, Cap. iv.

" upon them in a violent ſtorm of wind; and ſoon after he " himſelf was afflicted with ſcabs and foul ulcers all over his " body; ſo that he ſate down among the aſhes, and ſcraped " himſelf with a potſherd." Thus from a very rich man he became extremely poor, and from the heighth of proſperity he ſunk into the depth of miſery. And yet all theſe evils did not give the leaſt ſhock to his firmneſs of mind, nor to his piety towards God [b]: wherefore the Lord, moved by his prayers, put an end to all his calamities; gave him twice as much wealth as he had loſt, and made him more proſperous than he had ever been before [c].

Now the book of Job may juſtly be eſteemed the moſt antient of all books, of which we have any certain account: for ſome are of opinion that it was written in the times of the patriarchs; many others, that it was compoſed about the days of Moſes, and even by Moſes himſelf; and there are but few who think it poſterior to him [d]. For my part, I embrace the learned Lightfoot's opinion, that it was compoſed by Elihu, one of Job's companions, chiefly becauſe he therein ſpeaks of himſelf as of the writer of this hiſtory [e], and if ſo, it will appear to be older than the days of Moſes. However this be, it is moſt certain that this book carries with it manifeſt tokens of very great antiquity; the moſt material of which ſeem to be theſe. In it there is not the leaſt mention made of the departure of the Iſraelites out of Egypt, of Moſes, or the Moſaick law. After the manner of the patriarchs, Job, as the head of his family, offered ſacrifices in his own private houſe, for the ſins of his children [f]. When he declares his integrity he ſcarcely mentions any other idolatry, but that moſt antient one, the worſhip of the ſun and moon [g], which we know to be very old, and to have firſt obtained among the neighbouring Chaldeans, and Phœnicians. In fine his own age, protracted far beyond the life of man in Moſes's time, is a proof of its antiquity, for he lived a hundred and forty years after an end had been put to his calamities; ſo that it is reaſonable to believe that he lived above two hundred years in all. For that he was aged, when his misfortunes crowded on him, may be hence inferred, that, although his three friends are ſtiled old men [h], yet in his diſputes with them, he does not ſeem to honour them for their age, as Elihu does. To avoid prolixity, I join with Spanheim in opinion, that Job's time coincides with the bondage of the children of Iſrael in Egypt, ſo as to be neither poſterior to their quitting that country, nor anterior to their entering it.

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[b] See Job Chap. i. and ii.

[c] The ſame Chap. xiii.

[d] See Spanheim's learned diſſertation on this ſubject in the book above quoted, Chap. viii. and ix.

[e] His works, tom. i. pag. 24.

[f] Job Chap. i. ver. 5.

[g] The ſame, chap. xxxi. ver. 26, 27.

[h] Job chap. xxxii. ver. 6.

But there ſubſiſts a diſpute of a different nature between very grave authors, and that is, whether this narrative be a fable or a true hiſtory: if I were allowed to interpoſe my opinion, I would ſay, that it is not a parable invented by ὑποτύπωσις, but a dramatick poem compoſed upon a true hiſtory; and perhaps with this deſign, that from the example of this illuſtrious and upright, yet afflicted and moſt miſerable man, the people of Iſrael might learn to bear with patience, all thoſe evils and hardſhips, which they were daily ſuffering in their Egyptian captivity. That this book is metrical, as well as David's Pſalms, the Proverbs, Eccleſiaſtes, and Solomon's Song, is generally allowed: and the perſons of the drama are God, Satan, Job and his wife, his three friends, and Elihu. Wherefore it is, ſays Grotius, a real fact, but poetically handled [l]. Poetry was certainly a very antient manner of writing, and poets were wont to embelliſh true hiſtories in their own way, as we ſee in the moſt antient among the Greeks and Romans. And among the Hebrews likewiſe, long after the time above-mentioned, Ezekiel compriſed the hiſtory of the departure out of Eggpt in a dramatick poem, upon which account he is called by Clemens Alexandrinus, the poet of Judaick tragedies [k]. Nor indeed, in my opinion, can there be found, in this kind of writing, any thing more admirable, and better adapted to move the paſſions than this piece; whether we regard the ſublimity and elegance of ſtyle, the deſcription of natural things, or in fine, the propriety of the characters aſcribed to all the perſons concerned in it; all which circumſtances are of the greateſt moment in a dramatick performance.

———Quo propius ſtes
Te capiet magis.

———The nearer you behold,
The more it ſtrikes you.

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[l] Eſt ergo res vere geſta, ſed poeticè tractata. In locum.

[k] Ὁ τῶν Ἰȣδαϊκῶν τραγῳδιῶν ποιητής. Stromat. book i. pag. 414, of the Oxford Edit. 1715.

Before I cloſe this chapter, it may not be improper to offer my conjecture concerning the diſeaſe of this illuſtrious man But previous to this, it is proper to remark, that it is not Job himſelf, or his friends, but the author of the book that attributes his calamities to Satan ; for this author's intention ſeems to be, to ſhew, by a ſtriking example, that the world is governed by the providence of Almighty God, and as the holy angels, whoſe miniſtry God makes uſe of in diſtributing his bountiful gifts, punctually execute all his commands ; ſo Satan himſelf with his agents are under the power of God, and cannot inflict any evils on mankind without the divine permiſſion. Thus, when the Sons of God (angels) came and preſented themſelves before the Lord, it is ſaid that Satan came alſo among them. Now the word aſtare to preſent one's ſelf, as Moſes Maimonides [l] obſerves, ſignifies to be prepared to receive Jehovah's commands, but Satan came of his own accord and mixed with them without any ſummons.

Now as to the diſeaſe, it is plain that it was cuticular, and as it is certain that the bodies of the Hebrews were very liable to foul ulcers of the ſkin from time immemorial ; upon which account it is, that learned men are of opinion that they were forbid the eating of ſwine's fleſh (which, as it affords a groſs nouriſhment, and not eaſily perſpirable, is very improper food in ſuch conſtitutions) wherefore by how much hotter the countries were which they inhabited, ſuch as are the deſarts of Arabia, the more ſeverely theſe diſorders raged. And authors of other nations, who deſpiſed and envied the Jews, ſay that it was upon this account that they were driven out of Egypt ; leſt the leproſy, a diſeaſe common among them, ſhould ſpread over the country [m]. But there is another much worſe diſeaſe, ſo frequent in Egypt, that it is ſaid to be endemial there [n], though it may alſo be engendered in this hot country, I mean the Elephantiaſis. Perhaps it was this, which is nearly of the ſame nature with the leproſy, that had affected the body of our righteous man : but on this ſubject we ſhall treat more largely in the ſubſequent chapter.

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[l] More Nevochim, Part. iii. chap. xxii.

[m] Juſtin. Hiſt. Lib. xxxvi. C. 2. & Tacit. Hiſt. Lib. v. ab initio.

[n] Lucret. Lib. vi. ver. 1112.

> *Eſt elephas morbus, qui propter flumina Nili.*
> *Gignitur Ægypto in media.*

CHAP

CHAP. II.

The LEPROSY.

A MOST ſevere diſeaſe, to which the bodies of the Jews were very ſubject, was the Leproſy. Its ſigns recorded in the holy ſcriptures are chiefly theſe. Pimples aroſe in the ſkin; the hair was turned white; the plague (or ſore) in ſight was deeper than the ſkin, when the diſeaſe had been of long ſtanding; a white tumour appeared in the ſkin, in which there was quick fleſh; the foul eruptions gained ground daily, and at length covered the whole ſurface of the body. And the evil is ſaid to infect, not only the human body, but alſo the cloaths and garments, nay (what may ſeem ſtrange) utenſils made of ſkins or furs, and even the very walls of the houſes. Wherefore there are precepts laid down for cleanſing theſe alſo, as well as the lepers.

Medical authors are of different opinions concerning the contagion of this diſeaſe. And whereas neither the Arabian nor Greek phyſicians, who have treated largely of the Leproſy, have given the leaſt hint of this extraordinary force of it, whereby it may infect cloaths and walls of houſes; the Rabbin doctors diſpute, whether that which ſeized the Jews, was not entirely different from the common Leproſy; and they all affirm, that there never appeared in the world, a Leproſy of cloaths and houſes, except only in Judea, and among the ſole people of Iſrael.

For my part, I ſhall now freely propoſe, what I think moſt probable on the ſubject. One kind of contagion is more ſubtile than another; for there is a ſort, which is taken into the body by the very breath; ſuch as I have elſewhere ſaid to exiſt in the plague, ſmall-pox, and other malignant fevers. But there is another ſort, which infects by contact alone; either internal, as the venom of the venereal diſeaſe; or external, as that of the itch, which is conveyed into the body by rubbing againſt cloaths, whether woollen or linnen. Wherefore the Leproſy, which is a ſpecies of the itch, may paſs into a ſound man in this laſt manner; perhaps alſo by cohabitation; as Fracaſtorius has obſerved, that a conſumption is contagious, and is contracted by living with a phthiſical perſon, by the gliding of the corrupted and putrefied juices of the ſick into the lungs of the ſound man [a]. And Aretæus is of the ſame opinion with regard to the Elephantiaſis, a diſeaſe nearly allied to the Leproſy: for he gives this caution, “That “it is not leſs dangerous to converſe and live with perſons “affected with this diſtemper, than with thoſe infected with “the plague; becauſe the contagion is communicated by the “inſpired[b] air.”

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[a] De morbis contagioſis. Lib. ii. cap. ix.

But here occurs a conſiderable difficulty. For Moſes ſays, “If in the Leproſy there be obſerved a white tumour in the “ſkin, and it have turned the hair white in it, and there be “quick fleſh within the tumour; it is an old Leproſy in the “ſkin of his fleſh. But if the Leproſy ſpread broad in the “skin, and cover the whole skin of the diſeaſed from his “head even to his feet, the perſon ſhall be pronounced[c] “clean.” But the difficulty contained in this paſſage will vaniſh, if we ſuppoſe, as it manifeſtly appears to me, that it points out two different ſpecies of the diſeaſe; the one in which the eroded ſkin was ulcerated, ſo that the quick fleſh appeared underneath; the other, which ſpread on the ſurface of the ſkin only in the form of rough ſcales. And from this difference it happened, that the former ſpecies was, and the latter was not, contagious. For theſe ſcales, being dry and light like bran, do not penetrate into the ſkin; whereas the purulent matter iſſuing from the ulcers infects the ſurface of the body. But concerning the differences of cuticular diſeaſes, I heartily recommend to the reader's peruſal, what Johannes Manardus, equally valuable for his medical knowledge, and the purity of his Latin, has written upon the ſubject[d].

There is no time, in which this diſeaſe was not known; but was always more ſevere in Syria and Egypt, as they are hotter countries, than in Greece and other parts of Europe; and it is even at this day frequent in thoſe regions. For I have been aſſured by travellers, that there are two hoſpitals for the leprous alone in Damaſcus. And there is a fountain at Edeſſa, in which great numbers of people affected with this cuticular foulneſs waſh daily, as was the antient cuſtom.

Moreover we read the principal ſigns, which occur in the deſcription of the Moſaick Leproſy, excepting only the infection of the cloaths and houſes (of which by and by) recorded by the Greek phyſicians. Hippocrates calls himſelf the λεύκη or white Leproſy Φοινικίη νȣ̃σος the Phœnician diſeaſe[e]. For that the word φθινικὴ ought to be read Φοινικίη, appears manifeſtly from Galen in his Explicatio linguarum Hippocratis; where he ſays that φοινικίη νȣ̃σος is a diſeaſe which is frequent in Phœnicia and other eaſtern regions[f]. In the foregoing chapter I ſaid that the Leproſy (Leuce) and the Elephantiaſis, were diſeaſes of great affinity[g]: in confirmation of which notion the ſame Galen obſerves, that the one ſometimes changes into the other[h]. Now theſe two diſtempers are no where better deſcribed than by Celſus, who lived about the time of Auguſtus Cæſar, and having collected the works of the principal Greek writers in phyſick and ſurgery, digeſted them into order, and turned them into elegant Latin with great judgment. Thus he deſcribes the leprous diſeaſes. “There “are three ſpecies of the Vitiligo. It is named ἄλφος, when “it is of a white colour, with ſome degree of roughneſs, “and is not continuous, but appears as if ſome little drops “were diſperſed here and there: ſometimes it ſpreads wider, “but with certain intermiſſions or diſcontinuities. The μέλας “differs from this in colour, becauſe it is black, and like a “ſhadow, but in other circumſtances they agree. The λεύκη “has ſome ſimilitude with the ἄλφος, but it has more of the “white, and runs in deeper: and in it the hairs are white, “and like down. All theſe ſpread themſelves, but in ſome “perſons quicker, in others ſlower. The Alphos and Me- “las come on, and go off ſome people at different times; “but the Leuce does not eaſily quit the patient, whom it has “ſeized[i]. But in the Elephantiaſis, ſays the ſame author, “the whole body is ſo affected, that the very bones may be “ſaid to be injured. The ſurface of the body has a number “of ſpots and tumours on it; and their redneſs is by degrees “changed into a duſky or blackiſh colour. The ſurface of “the ſkin is unequally thick, and thin, hard and ſoft; and “is ſcaley and rough: the body is emaciated; the mouth, legs “and feet ſwell. When the diſeaſe is inveterate, the nails “on the fingers and toes are hidden by the ſwelling[k].” And the accounts left us by the Arabian phyſicians, agree with theſe deſcriptions. Avicenna, the chief of them, ſays that the Leproſy is a ſort of univerſal cancer of the whole body[l]. Wherefore it plainly appears from all that has been ſaid, that the Syrian Leproſy did not differ in nature, but in degree only, from the Grecian, which was there called λεύκη; and that this ſame diſeaſe had an affinity with the Elephantiaſis, ſometimes among the Greeks, but very much among the Arabs. For the climate and manner of living, very much aggravates all cuticular diſeaſes.

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[b] De cauſis diuturnorum morborum, & de curationibus eorundem. Lib. ii. cap. xiii.

[c] Levit. chap. xiii. ver. 10, &c.

[d] Epiſt. Medicinal. Lib. vii. Epiſt. ii.

[e] Prorrhetic. Lib. ii. ſub finem.

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[f] Ἡ κατὰ Φοινίκην, ϗ κατὰ τὰ ἄλλα ἀνατολικὰ μέρη πλεονάζȣσα.
[g] Pag. 450. [h] De ſimpl. medicam. facult. Lib. xi. [i] De medicina. Lib. v. Cap. xxviii. ſect. 19. [k] Lib. iii. Cap. xxv. [l] Canon. Lib. iv. Fen. 3. Tract. 3. Cap. i.

Now with regard to the infection of the cloaths, it has been found by the moſt certain experiments, not only in the plague, and ſome other malignant eruptive fevers, as the ſmall-pox and meaſles, but even in the common itch; that the infection, once received into all ſorts of furs and ſkins, woollen, linnen, and ſilk, remains a long time in them, and thence paſſes into human bodies. Wherefore it is eaſy to conceive, that the leprous miaſmata might paſs from ſuch materials into the bodies of thoſe, who either wore or handled them, and, like ſeeds ſown, produce the diſeaſe peculiar to them. For it is well known, that the ſurface of the body, let it appear ever ſo ſoft and ſmooth, is not only full of pores, but alſo of little furrows, and therefore is a proper neſt for receiving and cheriſhing the minute, but very active, particles exhaling from infected bodies. But I have treated this ſubject in a more extenſive manner in my Diſcourſe on the Plague [m]. And theſe ſeeds of contagion are ſoon mixed with an acrid and ſalt humour, derived from the blood; which as it naturally ought, partly to have turned into nutriment, and partly to have perſpired through the ſkin, it now lodges, and corrodes the little ſcales of the cuticle: and theſe becoming dry and white, ſometimes even as white as ſnow, are ſeparated from the ſkin, and fall off like bran. Now, although this diſeaſe is very uncommon in our colder climate; yet I have ſeen one remarkable caſe of it, in a countryman, whoſe whole body was ſo miſerably ſeized by it, that his ſkin was ſhining as if covered with ſnow: and as the furfuracious ſcales were daily rubbed off, the fleſh appeared quick or raw underneath. This wretch had conſtantly lived in a ſwampy place, and was obliged to ſupport himſelf with bad diet and foul water.

But it is much more difficult to account for the infection of the houſes. For it ſeems hardly poſſible in nature, that the leprous ſpots ſhould grow and ſpread on dry walls, made of ſolid materials. But upon a ſerious conſideration of the different ſubſtances employed in building the walls of houſes, ſuch as ſtones, lime, bituminous earth, hair of animals, and other ſuch things mixed together; I thought it probable, that they may by a kind of fermentation, produce thoſe hollow greeniſh or reddiſh ſtrokes, in ſight lower than the wall (or within the ſurface [n]) which, as they in ſome meaſure reſembled the leprous ſcabs on the human body, were named the Leproſy in a houſe. For bodies of different natures, very eaſily efferveſce upon being blended together. Wherefore we may reaſonably ſuppoſe that this moiſture or mouldineſs, gradually coming forth, and ſpreading on the walls, might prove very prejudicial to the inhabitants, by its ſtinking and unwholeſome ſmell, without having recourſe to any contagious quality in it. And ſomewhat analogous to this is pretty frequently ob-obſervable in our own houſes; where, when the walls are plaiſtered with bad mortar, the calcarious and nitroſe ſalts ſweat out upon their ſurface, of a colour almoſt as white as ſnow. The power of inſpecting their houſes was inveſted in the prieſts; who, when they obſerved this foulneſs, gave orders firſt to have the walls of the houſe ſcraped all around; and afterwards, if it continued to break out, to pull down the houſe, and carry the materials out of the city into an unclean place.

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[m] Chap. i.

I am well aware, that all this is related, as if God himſelf had ſtruck the houſe with this plague. But it is well known, that that way of ſpeaking is not uncommon in the Jewiſh hiſtory; as in unexpected evils and dreadful calamities, which are ſometimes ſaid to be done by the hand of God; though they may be produced by natural cauſes. Nor can I be eaſily induced to believe, with ſome divines, that God, who commanded his people to be always free from every ſort of uncleanneſs, would vouchſafe to work a miracle, in order to inflict this moſt filthy puniſhment on any perſon. Thus much is indubitable, that the precepts of the Moſaick law were conſtituted particularly, to avert the people from idolatry and falſe religion, and at the ſame time to keep them clear of all uncleanneſs [o]. To this end conſpired the prohibition of eating blood, carrion, or animals that died ſpontaneouſly, ſwines fleſh, and that of ſeveral other creatures [p]. For all theſe meats yield a groſs nutriment, which is improper and prejudicial in diſeaſes of the ſkin.

But in order to cloſe theſe theological reſearches with ſomewhat medical, I am convinced from experience, that there is not a better medicine known againſt this filthy diſeaſe, than the tincture of cantharides of the London Diſpenſatory. Its remarkable virtue in this caſe, is owing to the diuretick quality of theſe flies. For there is a great harmony between the kidneys and glands of the ſkin, ſo that the humours brought on the latter, eaſily find a way through the former, and are carried off by urine: and on the other hand, when the kidneys have failed in the performance of their functions, an urinous humour ſometimes perſpires through the cuticular pores. But ſuch catharticks are to be interpoſed at proper intervals, as are the moſt proper for evacuating thick and acrid humours.

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[n] Levit. Chap. xiv. ver. 37.

[o] Moſ. Maimonid. More Navochim, Part. iii. Chap. xxxiii & xlviii.

[p] Levit. Chap. xi. & xvii.

CHAP. III.

The Diſeaſe of king SAUL.

WHEN "king Saul was abandoned by the Spirit of "God, and an evil ſpirit from the Lord troubled "him; his courtiers perſuaded him to command his ſervants "to ſeek out ſomebody that was a good player on the harp, "who might ſooth or compoſe him by his muſick, when the "evil ſpirit from God was upon him." Which when Saul had done, by ſending meſſengers for David; "whenever it "happened that Saul was ſeized with that evil ſpirit, David "took his harp, and played on it; and thus Saul was re"freſhed, and became compoſed, and the evil ſpirit depart"ed from him[a]."

Now to me it appears manifeſt, that this king's diſeaſe was a true madneſs, and of the melancholick or atrabilarious kind, as the antient phyſicians called it. And the fits returned on him at uncertain periods, as is frequently the caſe in this ſort of diſeaſe. Nor could the cauſe of that diſorder be a ſecret, ſeeing he had been lately deprived of his kingdom by God's expreſs command. Likewiſe the remedy applied, to wit, playing on the harp, was an extremely proper one. For phyſicians have long ſince taught us, that ſymphonies, cymbals, and noiſes were of ſervice towards diſſipating melancholick thoughts[b]; the power of which we have accounted for in another place upon geometrical principles[c]. Hence alſo it more plainly appears, that the diſorder was owing to natural cauſes; for otherwiſe how could the muſick of a harp drive it away? Counſel and prudence in a man was, in the Hebrew language, uſually ſtiled the Spirit of God; and a perſon deprived of theſe qualities, was ſaid to be troubled with an evil ſpirit, that is, to be mad.

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[a] See Samuel, or Kings, Book i. Chap. xvi.

[b] See Celſ. Lib. iii. cap. xviii.

[c] Mechanical account of Poiſons, Eſſay ii. Ed. iv.

I am not ignorant that the Jews, by a manner of expreſſion familiar among them, are wont to deſcribe diſeaſes of this kind, to the power of evil angels, as miniſters of God; and that even at this day, ſome very learned men defend the ſame notion. But for my part, if I may be allowed to declare my thoughts with freedom, I cannot think it right to have recourſe to the divine wrath for diſeaſes, which can be proved to have natural cauſes; unleſs it be expreſly declared, that they were ſent down directly from heaven. For if they fall on us in puniſhment of our ſins, the intention of the ſupreme lawgiver would be fruſtrated, unleſs a ſure rule was given, whereby his vengeance might be diſtinguiſhed from common events; in as much as the innocent may be equal ſharers in ſuch calamities with the guilty. Moreover, it ſeems reaſonable to believe, that evils inflicted by the omnipotent Judge, muſt be either incurable, or curable by himſelf alone; that the connection of his power with his equity, may the more brightly ſhine forth. By ſuch a criterion, are miraculous works diſtinguiſhed from the operations of nature. For it would be impiety to ſuppoſe, that the almighty Creator of heaven and earth intended, that his works ſhould be performed in vain. Wherefore it is worthy of our obſervation, that great care is always taken in the ſacred hiſtories, to make the divine power in ſuch caſes, appear moſt manifeſt to all. Thus when the Lord had infected Miriam (or Mary) with a leproſy, for a ſin committed by her, and conſented, on the ſupplication of Moſes, to make her whole; it was not done till ſeven days afterward [d]. Gehazi's leproſy remained in him and his progeny for ever [e]. King Azariah was ſmote with the leproſy, for not having demoliſhed the high places; and he was a leper unto the day of his death [f]. Ananias and his wife were ſtruck dead ſuddenly by the miraculous power of St. Peter [g]. Elymas the ſorcerer, was ſtruck blind for a ſeaſon by St. Paul, for his frauds and wickedneſs [h]. Therefore ſince threats and plain indications of diſeaſes, inflicted in an uncommon manner, are always manifeſtly declared; whenſoever theſe are wanting, why may we not ſay, that the event was by no means ſupernatural? And I deſire, once for all, that this ſentiment may hold good with regard to ſeveral other calamities.

[d] Numbers, chap. xii. ver. 14. [e] Kings, Book ii. (al. iv.) chap. v. ver. 27. [f] The ſame chap. xv. ver. 5. [g] Acts, chap. v. [h] The ſame chap. xiii. ver. 11.

CHAP. IV.

The diſeaſe of king JEHORAM.

OF king Jehoram it is related, that, "for his wicked life, "the Lord ſmote him in his bowels with an incurable "diſeaſe, ſo that he voided his inteſtines daily for the ſpace of "two years, and then died of the violence of the diſtemper [a]." Two impious kings are recorded to have had the ſame end, Antiochus Epiphanes, and Agrippa; of whom it was ſaid: Εἰς τί τὰ σπλάγχνα τοῖς οὐ σπλαγχνιζομένοις [b]. Of what avail are bowels to thoſe who have no bowels?

Now this diſtemper ſeems to me to be no other than a ſevere dyſentery. For in this the inteſtines are ulcerated, and blood flows from the eroded veſſels, together with ſome excrement, which is always liquid, and ſlimy matter; and ſometimes alſo ſome fleſhy ſtrings come away, ſo that the very inteſtines may ſeem to be ejected.

CHAP. V.

The diſeaſe of king HEZEKIAH.

"WHEN Hezekiah lay ſick of a mortal diſeaſe, and "the prophet Iſaiah went and declared to him, by "God's expreſs command, that he ſhould die and not recover; the Lord moved by his prayer, commanded Iſaiah to "return, and tell him, that he would cure him in three days. "Whereupon Iſaiah ordered a maſs of figs to be taken, and "laid it on the boil; whereby he recovered [a]."

Now to me it ſeems extremely probable, that this king's diſeaſe was a fever, which terminated in an abſceſs: for in caſes of this kind, thoſe things are always proper, which promote ſuppuration; eſpecially digeſtive and reſolving cataplaſms; and dried figs are excellent for this intention. Thus, the omnipotent, who could remove this diſtemper by his word alone, choſe to do it by the effect of natural remedies. And here we have an uſeful leſſon given us in adverſities, not to neglect the uſe of thoſe things, which the bountiful Creator has beſtowed on us, and at the ſame time to add our fervent prayers, that he would be graciouſly pleaſed to proſper our endeavours.

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[a] Chronicles, Book ii. Chap. xxi. ver. 18.

[b] See the notes of Grotius on this place.

[a] 2 Kings, Chap. xx.

CHAP. VI.

Of the diſeaſe of Old-age.

OLD-AGE itſelf is a diſeaſe, as the poet has properly expreſſed it [b]. Wherefore as I have frequently read with pleaſure, the very elegant deſcription of it, given by Solomon the wiſeſt of kings; I think it will not be foreign to my deſign, to attempt an explanation and illuſtration thereof. For it contains ſome things not eaſy to be underſtood, becauſe the eloquent preacher thought proper to expreſs all the circumſtances allegorically. But firſt I will lay the diſcourſe it ſelf before my readers, which runs thus:

"Remember thy Creator in the days of thy youth, before "the evil times come, and the years draw nigh, in which, "thou ſhalt ſay, I find no pleaſure: before the ſun, and the "light, and the moon, and the ſtars be darkened, and the "clouds return after rain; when the keepers of the houſe "ſhall tremble, and the ſoldiers ſhall give way, and the diminiſhed grinders ſhall ceaſe; and thoſe that look out through "holes ſhall be darkened; and the doors ſhall be ſhut outwardly, with a low ſound of the mill, and they ſhall riſe "up at the voice of the bird; and all the daughters of muſick "ſhall be of no avail; alſo when they ſhall be afraid of high "places and ſtumblings in the way; and the almond tree "ſhall flower, and the cicadæ ſhall come together; and the "appetite ſhall be loſt, man departing to his eternal habitation, and the mourners going about in the ſtreet: before "the ſilver chain be broken aſunder, and the golden ewer be "daſhed in pieces; and the pitcher be broken at the fountain "head; and the chariot be daſhed in pieces at the pit; and "the duſt return to the earth, ſuch as it had been; and the "Spirit return to God, who gave it [c]."

The recital of evils (and infirmities) begins from the aberrations of the mind. "The ſun, ſays Solomon, and the light, "and the moon, and the ſtars are darkened." Perceptions of the mind are leſs lively in old men; the ideas and images of things are confounded, and the memory decays: whence the intellectual faculties muſt neceſſarily loſe their ſtrength or power by degrees. Wiſdom and underſtanding are frequently called light in the ſacred ſcriptures [d]; and privation of reaſon, darkneſs and blindneſs [e]. Cicero likewiſe ſays very juſtly, that reaſon is as it were, the light and ſplendor of life [f]. Hence God is ſtiled the father of lights [g]. Thus the virtues of the mind decaying, may be compared to the luminaries of the world over-caſt. I am conſcious that this expoſition is contrary to that of a number of learned interpreters, who take this obſcuration of the light in the genuine ſenſe of the words, and think that the failing of the ſight is here to be underſtood. But I am ſurprized, how they happened not to take notice, that every thing in this diſcourſe, even to the moſt minute circumſtances, is expreſſed in words bearing a figurative ſenſe. For whereas, in deſcribing the infirmities of Old-age, the injuries of the operations of the mind, as the moſt grievous of all, were not to be pretermitted; ſo theſe could not be more clearly expreſſed, than by the obſcuration of the cœleſtial luminous bodies, which rule our orb, and cauſe the viciſſitudes of times and ſeaſons. Moreover it is particularly to be obſerved here, that the author mentions the defects of ſight lower down, and moſt certainly he would have avoided repeating the ſame thing.

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[b] Teren. Phorum. Act. iv. Scen. i. ver 9.

[c] Eccleſiaſtes, Chap. xii. ver. 1—7. tranſlated from Caſtalio's Latin verſion.

But he goes on, and adds, what well agrees with the foregoing explanation. “ The clouds return after rain.” That is, cares and troubles crowd on each other, and daily oppreſs aged folks. As in moiſt climates, and thoſe liable to ſtorms, even when the clouds ſeem to be exhauſted, others ſoon follow, and the rains become almoſt perpetual. And theſe inconveniencies are felt the more ſenſibly, in proportion to the debilitation of the powers of the mind, whereby they are rendered leſs able now, than formerly, either to bear, or get the better of their oppreſſions.

But from the mind our royal author now paſſes to the body. “ The keepers of the houſe, ſays he, ſhall tremble, and the “ ſoldiers ſhall give way, and the diminiſhed grinders ſhall “ ceaſe.” The limbs, and firmeſt parts of the body, are damaged by age: the hands and knees grow weak, through the relaxation of the nerves. Hence thoſe are rendered incapable of defending us againſt injuries, and of performing innumerable other good offices, for which they were originally intended; and theſe becoming unequal to the weight they were wont to ſuſtain, loſe their active ſuppleneſs, and fail in bending. Likewiſe the double teeth or grinders, either drop out, or rot away; ſo as now to be too few remaining to comminute ſolid food. In the tranſlation of the Hebrew word, which I have here rendered by double teeth or grinders, I followed Arias Montanus, who, in my opinion, has tranſlated it right. For it is in this paſſage uſed by the author in the plural number; who afterwards employs it in the ſingular, but in a quite different ſenſe, when he treats of the ſenſe of taſting; as I ſhall ſhew anon, when I come to that paſſage. For, that Solomon's intention in this place was, to deſcribe thoſe defects of the ſenſes, which generally ſteal on Old-age, I have not the leaſt doubt.

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[d] Job Chap. xviii. ver. 5, 6, 7. [e] Matthew Chap. vi. ver. 23. John Ep. i. Chap. ii. ver. 11. [f] Academ. iv. 8. [g] James, Epiſt. Chap. i. ver. 17.

Wherefore now proceeding to them, he begins by the ſight. "Thoſe, ſays he, that look through holes ſhall be darkened." By which words it is manifeſt, that he points out the failing of the eyes, which moſt people, far advanced in years, feel by ſad experience.

Next follows the taſte, which he thus deſcribes: "The "doors ſhall be ſhut outwardly, with a low ſound of the mill." As old people, through diminution of appetite, open their mouths ſeldomer than formerly; ſo for want of teeth to comminute their food, they do it with leſs noiſe. Now this laſt inconvenience ſeems to be meant and expreſſed very elegantly by the words, a low ſound of the mill: for by the word mill, which in the Hebrew is uſed in the ſingular number, the grinding of the food may very well be meant; and this grinding, as it is not done by the aſſiſtance of the teeth, which they have loſt, but by that of the gums, is performed with leſs noiſe.

Sleep is the ſweet ſoother of our labours, and the reſtorer of our exhauſted ſtrength. But the loſs of appetite, and diſguſt to our food, generally robs us of this comfort. Hence ſubjoining this evil of Old-age to the foregoing, he ſays: "he ſhall riſe up at the voice of the bird;" that is, the old man is awaked at the cock's firſt crowing. Wherefore his ſleep is ſhort and interrupted, though his weakneſs would require longer reſt.

But he returns to the ſenſes, among which he gives the third place to hearing; for receiving the benefits of which the Creator gave us the uſe of ears. Now this is frequently diminiſhed, and ſometimes entirely taken away in Old-age; which the royal author ſeems to indicate in the following words: "The daughters of muſick ſhall be of no avail."

avail." For thus he thought proper to expreſs the ears, to which at this time of life, not only the pleaſure of harmonious ſounds is ſought in vain; but, what is much more diſagreeable, the words in converſation are not eaſily underſtood: whereby the enjoyment, and one of the greateſt conveniencies of life, are gradually loſt. Hence in the Jewiſh hiſtory, Barzillai, at eighty years of age, complains that he could no longer hear the voice of the ſinging men and ſinging women[h].

Theſe defects of the organs of hearing, are immediately followed by thoſe of the ſenſe of feeling. Now the touch, as Cicero ſays, is uniformly ſpread over the whole body; that we may feel all ſtrokes and appulſes of things[i]. Wherefore this ſenſe, beſides its other uſes, contributes vaſtly to the ſafety of the body, and the removal of many evils, to which it is perpetually expoſed. And this the ſagacious author ſeems to have principally in view, when he ſays, "They ſhall be afraid "of high places, and ſtumblings in the way." For as old folks are unſure of foot, even in a plain ſmooth way, by reaſon of the weakneſs of their limbs; ſo when they come to a rugged uneven road, through the dulneſs of this ſenſe, they do not ſoon enough perceive the depreſſions or elevations of the ground, whereby they run the hazard of ſtumbling and hurting their feet. Therefore they are not unjuſtly repreſented as being afraid.

The only one that remains of the ſenſes is that of ſmelling, the diminution of which in old men, he deſcribes with equal elegance and brevity in this manner: "the almond-tree ſhall "flower." By which words he ſeems to mean, that old people, as if they lived in a perpetual winter, no longer perceive the agreeable odours exhaling from plants and flowers in the ſpring and ſummer ſeaſons. That this tree flowers in winter, we learn from Pliny, who in treating of it ſays: The almond-tree flowers the firſt of all trees, in the month of January[k]. I am not to learn, that theſe words are by moſt interpreters underſtood as relating to grey hairs, which being generally a ſure token of old age, they would have us believe, are denoted by the white flowers of the almond-tree. But then, who can imagine, that this wiſe author, after having indicated the defects of four of the ſenſes, by clear and diſtinct marks, would deſignedly paſs over the fifth in ſilence? Beſides, white hairs are by no means to be eſteemed a ſure and indubitable token of Old-age ; ſince there are not a few to be found, who turn grey in the middle ſtage of life, before their bodily ſtrength is any ways impaired. Moreover, what they ſay of the flowers of the almond-tree, does not ſeem to agree with the things they mean by them : for they are not, ſtrictly ſpeaking, white, but of a purpliſh caſt. Thus far concerning the ſenſes : let us proceed to the remaining part.

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[h] Samuel, (al. Kings) ii. Chap. xix. ver. 35.

[i] Nat. Deor. ii. 56.

[k] Lib. xvi. ſect. 42.

The ſcrotal rupture is a diſeaſe common to perſons far advanced in years ; whether it be formed by the inteſtine or omentum ſlipping down into the ſcrotum, or proceed from a humour diſtending that part. In either caſe the part is tumefied. This pernicious diſeaſe the preacher thought proper to compare to a graſshopper. " The graſshopper, ſays he, ſhall " be a burthen, Oneri erit locuſta." For thus the Hebrew phraſe is more literally tranſlated, than by convenient cicadæ ; the cicadæ ſhall come together, as the learned Caſtalio has rendered it. Indeed the Vulgate verſion has, impinguabitur locuſta, the graſshopper ſhall be fatted. The Septuagint Παχυνθῆ ἡ ἀχρίς. The graſshopper ſhall be fatted. The Arabick verſion, turned into Latin, pingueſcet locuſta, the graſshopper ſhall grow fat. But our Engliſh tranſlation, the graſshopper ſhall be a burden. It is well known, that the Hebrew language is always modeſt, and that the ſacred writers, in expreſſing ſuch things as belong to the genital members, abſtain from indecent and obſcene words, for fear of offending chaſte ears, and therefore borrow ſimilitudes from any other things at diſcretion. Which is particularly obſervable in the Canticum Canticorum, or Solomon's Song, written by our author. Now the graſshopper, or locuſt, is an odd-ſhaped animal, made up chiefly of belly ; and therefore, eſpecially when full of eggs, may be ſaid to bear ſome reſemblance to a ſcrotum, ſwoln by a rupture.

Theſe parts being thus affected, the wiſe author adds, " the " appetite ſhall be loſt ;" wherein he does not attend ſo much to the appetite for victuals, as for thoſe other things, which are ſought after in the vigour of life. For as the author of the Art of Love has rightly ſaid : Turpe ſenilis amor [1].

That old people are cruſhed to death by ſo great a heap of evils and infirmities, and depart to their eternal habitation, to the grief of their friends, can be no matter of wonder. But in the remaining part of the diſcourſe we are admoniſhed, that their miſeries in this life are not confined within theſe bounds, but that ſometimes there is ſtill an acceſſion of others.

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[1] Ovid. Amorum, lib. i. Eclog. ix. ver. 4.

For loſs of ſtrength in Old-age does not terminate at the limbs, or extremities of the body; the ſpine of the back alſo loſes conſiderably of its firmneſs, by the daily diminution of power in its muſcles and ligaments: hence an old man can ſeldom ſtand upright, but ſtoops his body towards the earth, which is ſhortly to cover it. This part is likened to a ſilver chain, which is ſaid to be broken aſunder. For the vertebræ, of which it is compoſed, may be looked upon as the rings or links, and they give way outward by the bending of the body. Moreover, the medulla oblongata, which paſſes through them, is of a ſilver or whitiſh colour.

Theſe points, which we have hitherto handled, are very difficult of explanation. But the three inconveniencies, which cloſe the diſcourſe, are true ænigma's, and require an Oedipus to ſolve them. And as ſuch an one, in my opinion, has not appeared hitherto, I will uſe my endeavours to do it. "The golden ewer, ſays he, is daſhed in pieces: the pitcher "is broken at the fountain-head; and the chariot is daſhed in "pieces at the pit."

Old men are troubled with defluxions from the head to the noſe, mouth and lungs; which are compared to water ruſhing out of a broken bottle or ewer. And the ewer is ſaid to be of gold, to expreſs the dignity of the head.

Nor does phlegm flow from the head alone; but other parts alſo pour forth their juices too abundantly or irregularly. For the ſeroſities, which are ſecreted by the kidneys (whoſe cavity is even at this day named pelvis by Anatomiſts) runs into the bladder; which, by reaſon of the relaxation of its ſphincter, as if the pitcher were broken at the fountain-head, is not able to retain its contents a ſufficient time. Hence an incontinence or dribbling of urine is continually troubleſome.

Now, the evils hitherto enumerated lodge in particular parts; but the laſt calamity, both in this diſcourſe, as well as in old people, is that the whole body is afflicted. The very courſe of the blood is interrupted; hence wretched man is ſeized with difficulty of breathing, apoplexies or lethargies. The heart alſo, the principle and fountain of life, ſinks through want of its uſual force, and "the broken chariot falls into the "pit." The ancients indeed did not know of the circulation of the blood; but they could not be ignorant, that it was moved through the body, that it cheriſhed the viſcera and members by its heat; and laſtly, that it concreted and grew cold in death.

But nothing in this whole diſcourſe is ſo much worthy of our ſerious attention as theſe words, with which he cloſes it. "The duſt returns to the earth, ſuch as it had been; and "the ſpirit returns to God, who gave it." For by theſe words his intention ſeems plainly to have been, to refute the ignorant notions of thoſe, who thought that the ſoul periſhed with the body, and to aſſert its immortality.

CHAP. VII.

The diſeaſe of king NEBUCHADNEZZAR.

THOSE things, which are related of Nebuchadnezzar king of Babylon, appear ſo ſurpriſing and contrary to nature, that ſome interpreters have imagined that he was really transformed into a beaſt. For "being driven from the "company of men for ſeven years, his dwelling was with the "beaſts of the field; he fed on graſs as oxen; his body was "wetted with the dew of heaven; his hair and nails were "grown like thoſe of birds. At length, at the end of that "ſpace of time, his underſtanding was reſtored to him, "and he was eſtabliſhed in his kingdom, and excellent ma-"jeſty was added unto him. Now his crime was pride, and "the contempt of God [a]."

All theſe circumſtances agree ſo perfectly well with hypochondriacal madneſs, that to me it appears evident, that Nebuchadnezzar was ſeized with this diſtemper, and under its influence ran wild into the fields: and that, fancying himſelf transformed into an ox, he fed on graſs in the manner of cattle. For every ſort of madneſs is, as I ſhall ſpecify more particularly hereafter [b], a diſeaſe of a diſturbed imagination; which this unhappy man laboured under full ſeven years. And through neglect of taking proper care of himſelf, his hair and nails grew to an exceſſive length; whereby the latter growing thicker and crooked, reſembled the claws of birds. Now, the ancients called perſons affected with this ſpecies of madneſs λυκανθρώποι or κυνανθρώποι; becauſe they went abroad in the night, imitating wolves or dogs; particularly intent upon opening the ſepulchres of the dead, and had their legs much ulcerated either by frequent falls, or the bites of dogs[c]. In like manner as the daughters of Prœtus related to have been mad, who, as Virgil ſays,

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[a] See Daniel, Chap. iv. and v.

[b] See Chap. ix. of Demoniacks.

> —— *Implerunt falſis mugitibus agros*[d].
>
> —— With mimick'd mooings fill'd the fields.

For, as Servius obſerves, Juno poſſeſſed their minds with ſuch a ſpecies of madneſs, that fancying themſelves cows, they ran into the fields, bellowed often, and dreaded the plough. But theſe, according to Ovid, the phyſician Melampus,

> —— *per carmen & herbas*
> *Eripuit furiis*[e]
>
> Snatch'd from the furies by his charms and herbs.

Nor was this diſorder unknown to the moderns; for Schenckius records a remarkable inſtance of it in a huſbandman of Padua, who imagining that he was a wolf, attacked, and even killed ſeveral perſons in the fields; and when at length he was taken, he perſevered in declaring himſelf a real wolf, and that the only difference conſiſted in the inverſion of his ſkin and hair[f].

But it may be objected to our opinion, that this misfortune was foretold to the king, ſo that he might have prevented it by correcting his morals; and therefore it is not probable that it befel him in the courſe of nature. But we know, that thoſe things, which God executes either through clemency or vengeance, are frequently performed by the aſſiſtance of natural cauſes. Thus having threatened Hezekiah with death, and being afterwards moved by his prayers, he reſtored him to life, and made uſe of figs, laid on the tumour, as a medicine for his diſeaſe[g]. He ordered king Herod, upon account of his pride, to be devoured by worms[h]. And no body doubts but that the plague, which is generally attributed to the divine wrath, moſt commonly owes its origin to corrupted air.

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[c] See Ætius, Lib. medicin. Lib. vi. and Paul. Ægineta, Lib. iii. Cap. xvi.

[d] Eclog. vi. 48.

[e] Metamorph. xv. 325.

[f] Obſervat. med. rar. de Lycanthrop. Obſ. 1.

[g] See above Chap. v. p. 602.

[h] See below, Chap. xv.

CHAP.

CHAP. VIII.

THE PALSY.

THERE are three paralyticks recorded in the holy goſpels to have been cured by Jeſus Chriſt [a]. The caſe of one of theſe, which is the third, having ſome ſingularities in it, I ſhall relate the particulars of it in the words of St. John: “ There is (ſays the evangeliſt) at Jeruſalem, by the
“ ſheep-market, a pool, near which lay a great multitude of
“ impotent folk, blind, halt, and withered, waiting for the
“ moving of the water. For an angel went down at a cer-
“ tain ſeaſon into the pool, and troubled the water: whoſo-
“ ever then firſt after the troubling of the water ſtepped in,
“ was made whole of whatſoever diſeaſe he had. And a cer-
“ tain man was there, who had an infirmity thirty and eight
“ years. When Jeſus ſaw him lie, and knew that he had been
“ now a long time in that caſe, he ſaid unto him, Wilt thou
“ be made whole? The impotent man anſwered him, Sir, I
“ have no man, when the water is troubled, to put me into
“ the pool; but while I am coming, another ſteppeth down
“ before me. Jeſus ſaid unto him, Riſe, take up thy bed,
“ and walk. And immediately the man was made whole,
“ and took up his bed, and walked.”

This pool, or at leaſt ſome other in its ſtead, is ſhewn to travellers even at this day by the friars who reſide there [b]. But, what is much more to the purpoſe, Euſebius aſſerts, that it actually exiſted in his time, and had two baſons; both of which were filled every year by the rains, at a ſtated time; and the water of one of them was of a ſurprizing red colour [c]: which laſt phænomenon he attributes, according to the vulgar opinion, to the ſacrifices, which were formerly cleanſed there. But I am clearly of opinion, that it was owing to a red earth or ocre, which is frequently found in baths, raiſed up from the bottom at certain times by the rains, and mixed with the water.

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[a] See Matthew, Chap. viii. and ix. and John, Chap. v. [b] See Cotovici Itinerarium Hieroſolymitarum, Lib. ii. cap. ii. and Maundrell's Journey from Aleppo to Jeruſalem, 8vo. p. 107. Oxford, 1714. [c] Onomaſticon urbium & locorum ſacræ ſcripturæ, in voce Βηζαθά.

Commentators find more than one difficulty here. For firſt they enquire what ſort of water this was; next why it could not exert its virtue without being troubled; then what was the nature of this troubling; and laſtly, concerning the angel, they do not agree who he was. Wherefore I will offer my opinion, in a conciſe manner, on theſe ſeveral points.

Firſt then, mineral waters were in high eſteem among the ancients for many diſeaſes: they uſed them inwardly and outwardly, and recommended them for different diſtempers, according to the nature of the mineral, with which they were impregnated. Thus in paralytick caſes, Celſus recommends ſwimming or bathing in the natural ſea or ſalt water, where it can conveniently be come at; where it cannot, even in water made ſalt by art [d]. And Pliny ſays, ſulphureous water is uſeful for the nerves, aluminous for paralyticks, or other relaxed habits of the body. He likewiſe adds; They uſe the mud of thoſe fountains with advantage, eſpecially if, when it is rubbed on, it be ſuffered to dry in the ſun [e]. The ſame author relates ſtrange things of ſome ſprings. In Bœtia, ſays he, there are two ſprings, one of which retrieves the memory, the other deſtroys it [f]. In Macedonia two ſtreams meet, one of them extremely wholeſome to drink, the other mortal [g]. And other things of the ſame nature. To theſe may be added what Lucian, an eye-witneſs relates of the river Adonis, in the country of the Byblii. The water of that river changes its colour once a year, and turning as red as blood, gives a purple tinge to the ſea, into which it runs: and the cauſe of this phænomenon he aſcribes to its paſſing through mount Libanus, whoſe earth is red [h]. Nor is it foreign to the purpoſe to obſerve, that there are wonderful eruptions of water in ſome countries. In the province of Connaught in Ireland, there is a fountain of freſh water on the top of a high mountain, which imitates the tide, by ſinking and overflowing twice a day [i]. A certain ſpring in Hungary in the country of Saros, is under the influence of the moon: ſince it is well known to increaſe with the moon's increaſe, to diminiſh with its decreaſe, and to run quite dry at the great change or new moon [k]. In fine, medicinal waters were not uncommon in Paleſtine, the accounts of which are collected by that great maſter of oriental literature, Hadrian Reland [l].

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[d] Lib. iii. cap. xxvii. [e] Lib. xxxi. 32. [f] Ibid. ſect. 11. [g] Ibid. ſect. 19. [h] De Dea Syria. [i] Vid. Ortelii Theatrum orbis terrarum. [k] Vid. Geo. Wernher. de admirandis Hungariæ aquis. [l] Palæſtina ex monument. vet. illuſtr. p. 300, &c.

Nevertheleſs thoſe who contend for a miracle in this place, ſay that there are no baths known, which can cure all diſtempers; nor any that retain their virtue but one ſingle month in the year: they likewiſe add, that it was the action of the angel troubling this water, that gave it its ſanative qualities. Thoſe who are of a different ſentiment, enumerate a number of waters, which become ſalutary at certain times of the year, by being then charged with metallick ſalts; the mud of which being brought up from the bottom, has been ſerviceable in many diſeaſes. Wherefore they ſay, it is not juſt to have recourſe to a ſupernatural power for effects, which may be produced by the ordinary courſe of nature. But as far as I am able to judge of theſe contradictory opinions, a middle way between them ſeems to me to come neareſt the truth.

For my notion of the matter is, that the water of this pool acquired its medicinal virtues from the mud ſettled at the bottom, which was charged with metallick ſalts, perhaps from ſulphur, allum, or nitre. And whenever it happened that the water was troubled by any natural cauſe whatſoever, perhaps a ſubterraneous heat, or rains; theſe ſalts were raiſed up and mixed with it, and might well be beneficial to thoſe, who went down into the pool, before the metallick particles ſubſided. Wherefore it is no wonder, that there lay, in the porches of this bath, which the evangeliſt ſays were five in number, a great multitude of impotent folk waiting for the moving of the waters; and eſpecially of ſuch as laboured under thoſe diſeaſes, for which it was ſerviceable, as blindneſs, palſies, and decays. And it was very natural for every individual perſon to endeavour to get into it as ſoon as poſſible; for fear of being fruſtrated of their cure by the ſubſidence of the mud. Wherefore he who firſt ſtept in, experienced the virtue of the water.

The next circumſtance to be obſerved is, that the fact here related, happened when there was a feaſt of the Jews, that is, the pentecoſt. And we learn from Euſebius, that this method of curing prevailed but once in a year [m]. But it is well known that this feaſt was celebrated in the month of May or beginning of June: which is a very proper ſeaſon for the virtues of medicinal waters. Upon which account the patients flocked thither the more eagerly, that they might catch a medicine, which they could make uſe of but once a year.

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[m] Loco citato.

Laſtly, with relation to the angel, who is ſaid to have troubled the water at a certain ſeaſon; thoſe who contend for a miracle, attribute the ſanative quality of the pool to him. But we have already taken notice, that whenever any thing uncommon or ſurpriſing happened, of which the Jews could not inveſtigate the cauſe, they were accuſtomed to ſay, it was done by the angel of the Lord. Yet it is poſſible, that God might have added this miraculous circumſtance to natural effects, that this pool ſhould be ſanative, at one certain time of the year only, and that too, when the whole nation were aſſembled to celebrate their ſolemn feſtival; and to him only, who firſt went into it. The reaſon of which proceeding (if it be allowed to form a conjecture on the divine counſels) might perhaps have been, that God was pleaſed to teſtify by ſo manifeſt a ſign, that he would not, as he had promiſed, entirely abandon his choſen people; before the coming of the Meſſias.

Wherefore upon the whole, this ſalutary virtue of the water, which might be medicinal by nature, ſeems to be ſo regulated by God, as at the ſame time to afford the Jews a token of his preſence. But the power of Chriſt, adminiſtered to this infirm man, a more noble remedy than that water, his evil-chaſing word [n]. And this power was the more ſeaſonable in this caſe, becauſe the diſeaſe was of ſo many years ſtanding, that it could not be removed by a natural remedy: whence his divine virtue ſhone forth the more brightly.

CHAP. IX.

OF DEMONIACKS.

THAT the Demoniacks, δαιμονιζομένοι, mentioned in the goſpels, laboured under a diſeaſe really natural, though of an obſtinate and difficult kind, appears to me very probable from the accounts given of them. They were indeed affected various ways. For ſometimes they rent their garments, and ran about naked; ſtriking terror into all thoſe whom they met, and even wounding their own bodies; ſo very furious, that though bound with chains and fetters, they broke their bonds, and rambled in the moſt lonely places, and among the ſepulchres of the dead. Sometimes alſo they cried out, that they were poſſeſſed by many devils, which they imagined could paſs out of themſelves into other bodies [a]. At other times, either they were worried, and made a hideous noiſe [b]; or were thrown on the ground, without being hurt, and the devil went out of them [c].

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[n] Αλεξικακον.

Theſe are all actions of madmen; but the diſpute is, whether they were wrought by devils, or by the violence of the diſeaſe. Thus much is certain, that in thoſe times it was a common opinion among the Jews, that evil ſpirits frequently took poſſeſſion of people, and tortured them in ſo ſurpriſing a manner, as if they were agitated by furies. For in the whole catalogue of diſeaſes, which afflict mankind, there is no other, that ſeems ſo much to ſurpaſs the force of nature, as this, in wretchedly tormenting the patient by fierce diſtractions of the mind, and exceſſively ſtrong, though involuntary, motions of the body. But moſt certainly we find nothing ſacred in all this, nothing but what may ariſe from a natural indiſpoſition of body. And in order to place this my opinion in the ſtronger light, it may not be improper to give a ſhort diſcourſe on madneſs; not indeed on that ſpecies, which comes on in an acute fever, and goes off with it, which is called a phrenzy, and is always of ſhort duration; but that other ſort, which is rivetted in the body, and conſtitutes a chronical diſeaſe.

Wherefore all madneſs is a diſeaſe of an injured imagination, which derives its origin from the mind, having been too long a time fixed on any one object. Hence proceed uneaſineſs and anxieties of mind concerning the event. And by how much the things, whoſe images inceſſantly occur to the imagination, are of greater moment in life, the more violently they diſturb the perſon; examples of which we ſee particularly in love and religion, wherein hope, fear, deſpair, and other contrary paſſions, ſucceeding each other by turns, drag the perſon different ways. That this is the caſe, will not be doubted by any one, who recollects, that a madman often has a good memory; manages his affairs, except when ſome vain ideas come acroſs his mind, with tolerable prudence, nay ſometimes with more than ordinary cunning; and that he oftimes recovers the entire and permanent uſe of his reaſon, by a courſe of proper medicines. Therefore in this diſorder the perſon is firſt overwhelmed by terrifying ideas, which are followed by wrath and fury, as attendants on anxiety: whence he threatens and attempts to do acts of the utmoſt cruelty to thoſe who approach him, and through exceſs of anguiſh, frequently lays violent hands even on himſelf: then he grows again melancholick; and thus rage and dejection of ſpirits affect him alternately: moreover it is no uncommon thing to ſee a perſon under theſe circumſtances, eſpecially when the diſeaſe has taken deep root by length of time, ſeeking unfrequented and ſolitary places, in order to avoid the converſation of his fellow creatures,

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[a] See Matthew, chap. viii. ver. 28. Mark chap. v. ver. 2. and Luke, chap. viii. ver. 27.

[b] Mark, chap. i. ver. 23—26. Luke, chap. iv. ver. 33—35.

Ipſe ſuum cor edens, hominum veſtigia vitans [d].

Gnawing his heart, ſhunning the ſteps of men.

Now, people afflicted with this diſorder, often live a long time. For all mad folks in general bear hunger, cold, and any other inclemency of the weather; in ſhort, all bodily inconveniencies, with ſurpriſing eaſe; as they enjoy a ſtrength of conſtitution ſuperiour to what might be eaſily imagined. Likewiſe it frequently happens, that an epilepſy comes on madneſs of a long ſtanding. For theſe diſeaſes are nearly related; and in this caſe, we know by experience, that there remain not the leaſt hopes of recovery. Laſtly, it is to be obſerved, that the patient is either frantick or melancholick, according as his habit of body is diſpoſed to receive this or that injury.

But that the caſting out of devils, is nothing more than the removal of madneſs, many do not believe, upon this account, that thoſe things which happen to perſons thus affected, ſeem to them impoſſible to be done by the force of nature. But certainly theſe gentlemen are too much ſtrangers to phyſick, and have not ſufficiently attended to phænomena no leſs ſurpriſing, which daily occur in other diſeaſes. Do we not often ſee that violent affections of the mind are the cauſe of death? A ſudden fright has deſtroyed many, and even exceſſive joy has been fatal. A dangerous diſtemper ſometimes paſſes from one part of the body to another, in the twinkling of an eye. The venom thrown into the maſs of blood by the bite of a mad dog, generally lies ſtill a good while; and at the end of ſome weeks, ſometimes months, exerting its ſtrength, it produces ſymptoms not inferior to thoſe, which are ſaid to be produced by devils. What is more ſurpriſing than ſome things which fall out in pregnancies? If a pregnant woman happens to have an eager deſire for any thing, and is diſappointed, ſhe ſometimes marks the fœtus with the figure or likeneſs of the object longed for, on this or that part of the body. And, what is ſtill more, and approaches to a prodigy, upon the mother being terrified by a ſudden injury done to any one part, that very part in the child ſuffers the ſame evil, and decays for want of nouriſhment. I know that the truth of ſtories of this kind, is called in doubt by ſome phyſicians, becauſe they cannot conceive, how ſuch things can happen. But many examples, of which I have been an eye-witneſs, have freed my mind of all ſcruples on this head. Now, the power of the imaginative faculty is ſo ſtupendous, that the mind is not leſs affected by falſe, than by true images, when daily ſubjected to them. This we find by experience in thoſe women, who are called witches, who, being under the influence of ſuch an error of the mind, frequently imagine that they not only converſe with devils, but alſo have entered into compacts with them; and perſiſt in theſe notions with ſuch obſtinacy, that, when they are brought to trial, they confeſs themſelves guilty of wickedneſſes, which they never perpetrated, though they know that they muſt ſuffer death for their confeſſion. Moreover, every body knows how wonderfully the mind is diſturbed in melancholicks. One of them thinks his head is made of glaſs, and is afraid of ſtirring abroad, for fear of having it broken: another believes himſelf to be actually dead, and refuſes food, becauſe the dead ought not to eat. There are a thouſand ſtories of this kind. I remember, a man of letters, with whom I was well acquainted, who poſitively aſſerted that he was big with child, and was vaſtly anxious for a happy delivery. I ſaw two others, who, when alone, fancied they heard the words of people whiſpering them in the ear. Nor is their caſe different, in my opinion, who perſuade themſelves that they ſee ghoſts and hobgoblins. For deliriums are a kind of dreams of people awake; and the mind in both caſes affects the body differently, according to the nature of its objects.

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[d] Cicero, Tuſcul. Diſp. Lib. iii. 26. who has turned into Latin this verſe of Homer: Ὂν θυμὸν κατέδων, ϖάτον ἀνθρώπων ἀλεείνων. Il. Z. ver. 202.

From what we have ſaid, it manifeſtly appears, how many different ways the leſſons of imagination, when they are confirmed by long habit, are capable of affecting a man, and entirely ruining his whole frame. But every body knows, that the human mind is diſturbed by nothing more than by fear; the cauſe of which is ſelf-love ingrafted in all men. Whereas then, as Cicero very juſtly obſerves, there is no nation ſo ſavage, no man ſo rude, as not to have ſome notion of the gods[e]; it is no wonder, that men conſcious of wicked deeds ſhould be ſtruck with the fear of God, whoſe empire over all created things they acknowledged. For, as they attributed every good thing, every benefit of this life, to the gods; ſo they were of opinion, that evils and calamities were ſent down by them in puniſhment of crimes. Now, idolatry, as I ſaid above[f], had its origin among the Chaldæans; and at firſt it conſiſted in the worſhip of the ſun and moon, but afterwards it was extended to the adoration of dæmons[g]. But theſe were believed to be divine miniſters; and that they were originally the ſouls of heroes and great men, who were worſhipped for ſervices done to mankind in general, or to their native country in particular. And this demoniack religion being propagated from the Chaldæans to the Phœnicians, then to the Egyptians, came afterwards to the Greeks, thence to the Romans, and in progreſs of time to the other nations.

But the Jews, accuſtomed to aſcribe every uncommon or wonderful work of nature to the agency of angels, as miniſters of the ſupreme Deity, could eaſily work up their minds to believe, that ſome dreadful diſeaſes, which injured the mind and body together, the cauſes whereof they could not inveſtigate, aroſe from the operation of evil angels. For we learn from Philo Judæus[h], with whom Joſephus alſo agrees in opinion, that they believed there were bad as well as good angels; that the good executed the commands of God on men, that they were irreprehenſible and beneficent; but the bad execrable, and every way miſchievous[i]. But a more illuſtrious example of this matter cannot be given, than in the narrative of Saul's diſeaſe[k], of which I have already treated[l]. Nor were madneſs and the epilepſy the only diſeaſes, which they imputed to devils. When Jeſus had reſtored ſpeech to the furious dumb man, he is ſaid to have done it by caſting out a devil[m]. And when he had cured another furious perſon, who was blind and dumb, the Phariſees reproached him with caſting out devils by Beelzebub the prince of the devils[n]. In fine, Chriſt himſelf uſes this common way of expreſſion, on occaſion of the woman which had a ſpirit of infirmity eighteen years, whom he freed from that infirmity; by ſaying, that Satan had held her bound theſe eighteen years [o].

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[e] Tuſc. quæſt. Lib. i. 13.
[f] Cap. i. p. 589.
[g] See Sir Iſaac Newton's Chronology, p. 160.
[h] Lib. de gigantibus.
[i] De bello Judaico, Lib. vii. cap. 6.
[k] See Samuel (or Kings) Book i. chap. xvi.
[l] Chap. iii. p. 599, &c.
[m] Matthew, Chap. ix. ver. 32.
[n] Ibid. Chap. xii. ver. 22.

And this cuſtom of taking madmen for Demoniacks, was not ſo peculiar to the Jews, but that it prevailed in other nations alſo. Hence in Herodotus, king Cleomenes is ſaid to be driven into madneſs, not by any dæmon, but by a habit of drunkenneſs, which he had contracted among the Scythians, whereby he became frantick [p]. And whereas δαιμονᾷν ſignifies the ſame thing as δαιμόνιον ἔχειν, Xenophon uſes this word for furere, to be raging mad or furious [q]. Moreover Ariſtophanes, intending to expreſs a high degree of the ſame diſeaſe, employs the word κακοδαιμονᾷν, and calls the higheſt deegree of madneſs, not μανίαν, but κακοδαιμονίαν [r]. Hence alſo, as Aretæus obſerves, this diſeaſe was called morbus ſacer, or the ſacred diſeaſe, becauſe it was imagined that ſome dæmon had entered into the man [s]. Wherefore the phyſicians found it abſolutely neceſſary to oppoſe this falſe notion with all their might. Becauſe the people were generally perſuaded, that diſeaſes, which they believed to be cauſed by evil ſpirits, were to be expelled, not by medical ſkill, but by religious rights and ceremonies. Upon this account the prince of phyſicians, Hippocrates, or at leaſt ſome one of his ſcholars, wrote a very uſeful piece [t], wherein he aſſerts, that no diſeaſes are inflicted on man, immediately, by any divine power; and that thoſe perſons ought to be accounted magicians and jugglers, who cover their ignorance with a veil of ſanctity, by infuſing ſuch notions into the minds of the people.

But with regard to this power of the devils over human bodies, believed equally by the Jews and other nations, I have already ſaid, that the divinity ought not to be made a party concerned in impoſing diſeaſes, which may poſſibly have natural cauſes; unleſs it be expreſly declared, that they were inflicted immediately by the hand of God [u]. For of all the diſeaſes, with which miſerable mortals are tormented, there are none ſo wonderful and dreadful to appearance, but may be the natural conſequences of bodily indiſpoſitions. Wherefore God himſelf, if he thinks proper, can employ either na-

[o] Luke, Chap xiii. ver. 16. [p] Lib. vi. cap. 84. [q] Memorabil. Lib. i. [r] Vid. Plautum, Act ii. Scen. 3. ver. 38. & Act. ii. Scen. 5. ver. 15. [s] Διὰ τῆς δόξης δαίμονος ἐς τὸν ἀνθρωπὸν εἰσόδȣ. De cauſis morbo diuturn. Lib. i. cap. 4. [t] De morbo ſacro. [u] Chap. iii. p. 600.

tural cauſes, or the miniſtry of good angels, to inflict all ſorts of diſeaſes on mankind. And I hope no body will believe, that the devils have had the power granted them of torturing men at their wanton pleaſure. But to ſay more on this ſubject ſeems the leſs neceſſary; becauſe two very learned divines of our nation have already treated it in a full and ample manner [x].

Therefore in order to put an end to theſe demoniacal diſeaſes, I will now briefly ſhew, how they are to be treated. And firſt of all, particular care ſhould be taken, to keep the patient's mind employed in thoughts directly contrary to thoſe, which poſſeſſed it before: for one ſet of ideas gives place to another, and by effecting this change, the mind is brought out of the ſtate in which it was: a circumſtance, to which the generality of phyſicians do not give ſufficient attention. When this can be brought about, the diſeaſe is ſometimes ſpeedily cured. But when either the long ſtanding of the diſtemper, or ſome other cauſe, renders this total change impracticable; at leaſt the ſtrength of the preſent ſet of ideas ought to be diminiſhed and deſtroyed by all poſſible means. The vain fears of ſome are to be diverted, and their diſmal thoughts diſpelled. The daring ferocity of others is to be curbed; for which end it is often neceſſary, to uſe hard words and threats. Likewiſe ſudden frights, which may give the mind a different commotion, from that which before diſturbed it, have been found to afford a temporary relief at leaſt. The antients preſcribed ſome corrections, ſuch as bindings and ſtripes [y]. And indeed it is ſometimes neceſſary to bind thoſe, who are too unruly; to prevent their doing miſchief to themſelves or others. But there is the leſs neceſſity for torments and ſtripes, becauſe all madmen are of ſuch a cowardly diſpoſition; that even the moſt frantick and miſchievous, after being once or twice tied, ſurrender at diſcretion, and thence forward refrain from committing any outrage, through fear of the puniſhment.

As to the medical part, the groſs humours of the body are to be thinned, and the diſorderly motion of the animal ſpirits is to be calmed. For which end blood-lettings, emeticks, catharticks, bliſters, and ſetons, alſo ſometimes coolings of the head are to be employed. To theſe the fœtid gums are to be added, eſpecially aſſa fœtida, myrrh, and galbanum.

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[x] See the works of Joſ. Mead, 1677, fol. diſcourſe vi. and enquiry into the meaning of Demoniacks, &c. [y] Vid. Celſus, Lib. iii. cap. xviii.

And camphire has been frequently found ſerviceable in exceſſive ferocity and want of ſleep. But when the diſeaſe is accompanied by a fever, nothing is more proper than nitre, given in as large quantities as the ſtomach will bear. Laſtly, the patient is to be kept to a ſlender diet, and compelled to uſe exerciſe. But in all evacuations, a certain degree of moderation ought to be uſed, leſt the madneſs be changed into a contrary diſeaſe, which the antients termed morbus cardaicus [z], that is an exceſſive weakneſs of body. In which caſe, the patient is ſo far exhauſted, that medicines are of no avail; but the miſerable dejected man drags the remains of life, alaſs! generally too long.

[z] Idem, lib. iii. cap. xix.

CHAP. X.

Of LUNATICKS.

AS ſome antient phyſicians attributed the falling ſickneſs to ſome divine power, ſo they aſcribed madneſs to the influence of the moon. Yet the Lunatick, σεληνιαζόμενος, whoſe diſeaſe is deſcribed in the goſpels, was affected with the falling ſickneſs [a]. Wherefore this patient (for there is but one of this kind expreſly recorded there) was either mad and epileptick at the ſame time, which is not uncommon; or he laboured under a periodical epilepſy, returning with the changes of the moon, which is a very common caſe. For the account given of him is very ſhort, that he oft times fell into the fire, and oft into the water. Now in this diſtemper a perſon falls down ſuddenly, and lies for ſome time as dead; or by a general convulſion of his nerves, his body is agitated, with diſtorted eyes, and he foams at the mouth. But at length he recovers out of the fit, and has no more knowledge or remembrance of it, than if nothing had happened to him. Yet Jeſus is ſaid to have rebuked the devil, and he departed out of him, and the child was cured. That this child's caſe was epileptick, appears more manifeſtly from the account given of it by the evangeliſt, who was alſo a phyſician: for he ſays that as ſoon as the ſpirit has ſeized the patient, he cries

[a] Matthew, chap. xvii. ver. 15. & 18.

cries out, foams at the mouth, and is torn and worried by him [b].

Now, as to theſe Ϲεληνιαζομένοι, who are ſubjoined to the demoniacks, as if their diſeaſes were different, and whom Jeſus is ſaid to have cured [c]; they were either mad, or mad and epileptick together, which is not an uncommon caſe, as we have juſt now ſaid. And as to devils, we have treated of them ſufficiently. But with relation to the moon, there is not the leaſt reaſon to doubt, but that the regular returns of the paroxyſms at certain times of the month, gave occaſion to men to believe, that this diſeaſe was lunar. For that planet has ſuch a real influence on this diſeaſe, that it frequently happens to ſome patients, never to be ſeized with the fit but about the new moon; which ſeems to join its energy to thoſe cauſes, that are adapted to produce this evil. But the manner of accounting for this I have delivered in another place; where I have plainly ſhewn that our atmoſphere has its tides as well as the ſea [d].

And indeed the great Hippocrates has long ſince taught, that this diſeaſe is owing to natural cauſes, and conſequently, by no means divine [e]. For although, in his time, neither the inward parts of the animal body, nor the properties of the blood and humours, eſpecially of the nervous fluid, were ſufficiently known; yet by his great ſagacity and experience, he has left us ſeveral uſeful obſervations, in relation both to the nature of the diſeaſe, and to its cure. For he has ſhewn, that it ariſes from too great a quantity of humours in the brain; and therefore that the beſt method of cure is to dry up, and leſſen the quantity of this peccant matter; without having recourſe to incantations and juggling tricks, ſo much in uſe in thoſe days.

But when in ſucceeding ages, the uſe of medicines became more common, a great number of remedies for this dreadful diſeaſe were invented, ſome of which indeed were too filthy and ſhocking: ſuch as drinking the warm blood of a gladiator juſt ſlain; eating human or horſe's fleſh, the teſticles and penis of ſome animals, and other things of the ſame kind [f]; as if matters ſo repugnant to nature, could be contrary to ſuch grievous defects of it. For ſo it often happens, that when a rational medicine is not to be found, any improper and raſh one is attempted. But ſuch experiments are to be abandoned to itinerant quacks, and credulous old women. Though even in our days our art is not ſufficiently purged of this filth in theſe caſes; ſeeing the dung of ſome birds, and the hoofs of quadrupeds are ſtill ordered to be ſwallowed down by the ſick. But whereas chemiſtry has furniſhed us with the means of extracting the ſalts, and other moſt active principles from bodies; to me it is matter of admiration, why phyſicians do not chooſe to order theſe principles to be taken pure into the body, rather than the coarſe and fœculant ſubſtances, that contain them; which are always diſagreeable, and ſometimes hurtful alſo, to the ſtomach. But this moſt difficult diſtemper demands helps far ſuperiour to theſe; nor will any one method of cure anſwer in all caſes, but the courſe muſt be altered according to the difference of conſtitution, &c. However, I will here propoſe thoſe things. which have been found to be moſt generally ſerviceable.

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[b] Luke, chap. ix. ver. 39, &c.

[c] Matthew, chap. iv. ver. 24.

[d] De morbo ſacro.

[e] See Influence of the Sun and Moon, chap. i and ii.

[f] See Celſus, lib. iii. cap. xxiii. & Cæl. Aurelian, lib. i. cap. 4.

Blood is to be taken away ſeveral times, according to the ſtrength of the patient, in order to check its impetus. Vomits are to be adminiſtered now and then, but cathartics more frequently. It is particularly requiſite to draw the redundant humour from the head, which is done by bliſters; but better, by applying a cauſtick near the occiput, and making an iſſue, which is to be kept conſtantly running.

Theſe remedies contribute indeed to weaken the paroxyſms; but for removing the cauſe, when it can be done (for ſometimes it cannot) other helps are requiſite. For it is manifeſt, that the cauſe lies chiefly in the nervous fluid, commonly called animal ſpirits. But to inveſtigate the manner how this fluid is affected in diſeaſes of this kind, would, in my opinion, be a fruitleſs labour. However, as I have ſhewn on another occaſion [g], that it conſiſts of very minute particles ſecreted from the blood in the brain, and receives and impriſons a conſiderable quantity of that elaſtick matter, univerſally diffuſed throughout all nature; it cannot be doubted, but that it may be ſo corrupted by ſome indiſpoſition of the body or mind, as to become more or leſs improper for executing the functions of life, and perform all animal motions, not at the command of the will, but in a diſorderly manner, and with a certain ungovernable impetuoſity. Now the beſt remedies for correcting this depraved condition of the animal ſpirits, are chiefly thoſe, which have the moſt powerful faculties of attenuating the humours, and throwing them out of the body by ſweat. Of theſe the moſt excellent are the root of wild valerian, Ruſſian caſtor, the fœtid gums, and native cinnabar, taken daily in pretty large quantities; with the interpoſition of cathartics at proper intervals, among which there is none better than the tinctura ſacra. I have long known by experience, that the celebrated miſleto of the oak, is an uſeleſs weed. And indeed how can it be otherwiſe, ſince it has ſcarcely any taſte or ſmell, and is entirely indebted to the religion of the druids for its great character. Wherefore it is to be ranked with thoſe other frivolous things, which ſuperſtition has introduced into phyſick; unleſs a perſon can work himſelf up into a belief, that the golden ſickle, with which it was cut down, the prieſt's ſnow-white garment, the ſacrifice of white bulls, and other ſuch trifling circumſtances, are conducive towards a cure[h].

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[g] Account of Poiſons, introduction.

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[h] Plin. hiſt. nat. lib. xvi. ſect. ult.

CHAP. XI.

The iſſue of blood in a woman.

SAINT Matthew relates, that "Chriſt, by his word "alone, cured a woman who had been diſeaſed with an "iſſue of blood for twelve years[a].

And here ariſes a queſtion, concerning the nature of this diſeaſe. But as the words in the Greek are γυνὴ αἱμοῤῥοῦσα, I am of opinion, that it was a flux of blood from the natural parts, which Hippocrates[b] calls ῥόον αἱμαλώδη, and obſerves, that it is neceſſarily tedious. Wherefore having been exhauſted by it for twelve years, may juſtly be ſaid to be incurable by human art.

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[a] Chap. ix. ver. 20.

[b] De morb. lib. i. ſect. 3.

CHAP.

CHAP. XII.

Weakneſs of the back, with a rigidity of the back-bone.

"THERE was a woman which had a ſpirit of infirmity eighteen years, and was ſo bowed together, "that ſhe could in no wiſe lift up herſelf, and Jeſus laid his "hands on her, and ſhe was freed from her infirmity, and "immediately made ſtrait [a]."

This woman was συγκύπτȣσα, that is, ſtooping forward; being unable ἀνακύψαι, or to lift up her head. Now that ſpirit, according to the common way of ſpeaking of the Jews, was Satan. For thus Chriſt himſelf, anſwering the ruler of the ſynagogue, who was angry that the woman had been cured on the ſabbath day, ſays, that Satan had held her bound theſe eighteen years. And exactly in the ſame ſenſe St. Mark employs πνευμα ἄλαλον for a ſpirit, which obſtructed the faculty of ſpeech [d].

This infirmity often befalls thoſe, who have been very long afflicted with a diſorder of the loins: whence the muſcular fibres of that part become contracted and rigid. Wherefore it is very probable, that this tedious diſeaſe proceeded from that very cauſe, and was curable by the divine aſſiſtance only.

[a] Luke chap. xiii. 11. &c.

[b] Chap. ix. ver. 17.

CHAP. XIII.

The bloody ſweat of CHRIST.

SAINT Luke relates of Chriſt himſelf, that, "when "he was in an agony by the fervency of his prayers, his "ſweat was like drops of blood falling down on the ground [a]."

This paſſage is generally underſtood, as if the Saviour of mankind had ſweated real blood. But the text does not ſay ſo much. The ſweat was only ὡσεί θρόμβοι αἵματος, as it were, or like drops of blood; that is, the drops of ſweat were ſo large, thick and viſcid, that they trickled to the ground like drops of blood. Thus were the words underſtood by Juſtin

[a] Chap. xxii. ver. 44.

Martyr, Theophylactus, and Euthymius. And yet Galen has obſerved, that it ſometimes happens, that the pores are ſo vaſtly dilated by a copious and fervid ſpirit; that even blood iſſues through them, and conſtitutes a bloody ſweat[b].

[b] Lib. de utilitate reſpirationis.

CHAP. XIV.

The diſeaſe of JUDAS.

IN the number of diſeaſes, I rank the death of Judas, the wicked betrayer of Chriſt; of which I ſhall treat the more willingly, becauſe very learned interpreters of the holy ſcriptures have run into different opinions concerning it. And about fifty years ago, two famous profeſſors of hiſtory in the univerſity of Leyden, Jacobus Gronovius and Jacobus Perizonius, handled this controverſy in print with too much paſſion. For polite literature does not always poliſh its admirers.

The origin of the diſpute was this. Perizonius had publiſhed Ælian's Variæ hiſtoriæ, with his own notes and thoſe of others; where taking occaſion from what Ælian ſays of Poliager[a], he diligently examines the ſignification of the verb ἄπάγχεσθαι, which St. Matthew[b] employs in relating the death of Judas; and inſiſts that that word does not only mean ſtrangling with a halter, but alſo ſometimes exceſſive grief, by which a perſon is brought to the brink of death, and frequently even deſtroys himſelf. This criticiſm was taken amiſs by Gronovius, who had already publiſhed a book De morte Judæ, wherein he had ſaid that the wretch had voluntarily put an end to his life by a halter; wherefore he drew his pen, in order to refute his adverſary's reaſonings, and corroborate his own. Moreover he quarrels with Perizonius about the phraſe πρηνὴς γενόμενος, which he poſitively affirms ought to be underſtood not of a dying man, but ſolely of one actually dead, or of a dead body caſt or tumbled down. For St. Matthew ſimply ſays ἀπήγξατο[c], but St. Luke more fully, πρηνὴς γενόμενος ἐλάκησε μέσος, ϗ ἐξεχύθη πάντα τὰ σπλάγχνα αὐτοῦ[d], that is, falling headlong, he burſt aſunder in the midſt, and all his bowels guſhed out. Wherefore, if the verb ἀπάγχεσθαι can bear no other ſignification than that ſtrangling, which is performed by a halter, it is plain that the two evangeliſts do not agree together ; unleſs we ſay with the learned Caſaubon, that Judas hanged himſelf, but the rope broke, and he tumbled headlong down But this does not explain the manner of his death ; which St. Luke manifeſtly ſeems to have intended ; but barely adds a circumſtance of little moment, which happened after it, or at the very inſtant of it. Upon the whole it is certain, that by this word is not only meant ſuffocation by hanging, but alſo exceſſive grief, with which thoſe who are violently overpowered, frequently compaſs their own death. For, as Ovid ſays, ſtrangulat incluſus dolor. And indeed Perizonius has clearly proved this point by a number of examples, drawn from antient authors[e]. Nor is it leſs to be doubted, but that the expreſſion πρηνὴς γενόμενος, may be uſed for one, who voluntarily throws himſelf down, as well as for one, who falls headlong by ſome accident : which he has amply demonſtrated.

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[a] Lib. v. cap. viii. [b] Chap. xxvii. ver. 5. [c] Ibid.
[d] Acts, chap. i. ver. 18.

This controverſy coſt more than one diſſertation. But after ſeriouſly conſidering the ſtrength of the arguments produced by both parties ; I am of opinion, that the words of St. Matthew may be reconciled with the account given by St. Luke from St. Peter's ſpeech, in this manner. When that moſt unhappy traitor ſaw that Chriſt was condemned to death, he began to repent of his deed ; and being thereupon wrecked with grief and deſpair, or ſeized with the ſwimming in the head (which often happens in ſuch caſes) he fell headlong down ſome precipice ; or, which is more probable, he deſignedly threw himſelf down, and his body chancing to pitch on ſome large ſtone or ſtump of a tree, his bowels burſt forth, and he was killed. Wherefore Matthew declared his tortures of mind, which made him deſtroy himſelf ; but Luke has clearly and properly determined the manner of his death. Thus this kind of death ought, with good reaſon, to find a place in the liſt of diſeaſes, upon account of the real diſorder of the mind.

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[e] Vid. diſſert. de morte Judæ, & reſponſiones duas ad Gronovium, Lugd. Bat. 1702 & 3.

CHAP. XIV.

The diſeaſe of king HEROD.

THE diſeaſe with which Herod Agrippa is ſaid to have been ſmitten, by the juſt judgment of God, in puniſhment for his pride and of which he died, is remarkable. For he finiſhed his miſerable life σκωληκόβρωτος, that is, eaten by worms, as the ſacred hiſtorian relates, in theſe words; "Upon a ſet day, Herod, arrayed in royal apparel, ſat upon his throne, and made an oration unto them: and the people gave a ſhout, ſaying, it is the voice of a god, and not of a man. And immediately the angel of the Lord ſmote him, becauſe he gave not God the glory; and he was eaten of worms, and gave up the ghoſt [a]." Joſephus indeed, in his account of the fact, makes no mention of worms, but ſays that he was ſuddenly ſeized with violent gripings, and after being inceſſantly tortured with pains in his bowels for five days, he expired [b]. But St. Luke has informed us, that the worms, by which his bowels were eroded, were the cauſe of the gripes.

Now the greateſt ſingularity in this king's diſeaſe is, that it was inſtantly inflicted on him from heaven (which he himſelf acknowledged according to Joſephus [c]) otherwiſe as to verminoſe putrefaction in human bodies, we have ſeveral inſtances of it. For this very king's grandfather, Herod, ſurnamed the Great, is ſaid to have laboured under this diſeaſe a long time, till at length it threw him into a decay, of which he died [d]. Likewiſe Herodotus relates of Pheretima, the mother of Arceſilaus, king of Cyrene, that ſhe was rotted alive by worms [e]. And it is recorded of the Roman emperor Valerius Maximianus, that this ſame loathſome diſeaſe not only eat away his genital members, but put an end to his life [f]. Wherefore it was impoſſible, but that ſome at leaſt of the Greek phyſicians muſt have obſerved ſome caſes of this kind. And accordingly Galen has propoſed medicines for ulcers, σκώληκας ἔχοντα, that is, abounding with worms [g]. For he ſays, in abſceſſes there are frequently found animals, ζῶα, very like thoſe which are engendered from corruption[h]. And Philoxenus in Ætius ſays, that in the humour of Atheroma's, he ſometimes found animals, like gnats or little flies[i]. In fine, Paulus Ægineta teaches the method of getting rid of them[k].

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[a] Acts, chap. xii. ver. 21—23.

[b] Antiq. Jud. lib. xix. cap viii. ſect. 2.

[c] Ubi ſupra.

[d] Joſephus Ant. Jud. lib. xvii. cap. vi. (an. viii. ?) ſect. 5. & De Bello Jud. lib. i. cap. xxxiii. ſect. 5.

[e] Hiſt. lib. iv. a fine Ζωσα εὐλέων ἐξέζεσε,

[f] Sext. Aurel, Victor. Epitom. & Pompon. Læti Rom. Hiſt. compend.

[g] De compoſ. Medic. per genera, lib. iv. cap. x.

In ſo clear a caſe, it is needleſs to collect a greater number of authorities from the ancients, eſpecially ſince ſeveral modern phyſicians have made the ſame obſervations. For Marcellus Donatus mentions a perſon of high rank, extremely fat, whoſe belly was eroded and mortified by little worms engendered in his ſkin, which was exceſſively diſtended by fat and humours; and theſe worms were not unlike thoſe produced in old rotten cheeſe[l]. The learned Nicolaus Tulpius ſaw worms very like theſe, iſſuing with the urine out of the body of a very celebrated phyſician[m]. And the Ephemerides naturæ curioſorum, contain three remarkable caſes of this kind. The firſt is that of a certain Frenchman, whoſe blood was ſo corrupted, that very minute animals came forth day and night with horrid tortures, through moſt of the outlets of the ſkin, as the eyes, noſe, mouth, and bladder; and at length put an end to his miſerable life[n]. In the ſecond, black worms, not unlike ſcarabæi or beetles, came out of an abſceſs formed in the calf of the leg of a girl[o]. And in the third it is ſaid, that very ſmall white worms iſſued with the milk from the breaſts of a woman in childbed[p]. Nor can I omit two ſimilar caſes, one of which is related by Poterius, the other by his commentator Frideric Hoffman. The former attended a countryman, for a tumour on his right knee, out of which, when opened, little live worms, iſſued, which cauſed an intolerable pain in the part by their bitings. And the latter ſaw a tradeſman, who had a hard tumour about the veins of the arms, which was very troubleſome to him. This was opened by a ſurgeon ſeveral times without any benefit; until an ulcer was formed, out of which he took a great number of little black worms, armed with ſtings or prickles[q].

Now theſe hiſtories, wonderful as they ſeem, are not to be refuſed credit. For all nature is animated in a ſurprizing degree. The air which we breathe, the food which we eat; all fluids eſpecially, are full of animalcula of very different kinds. Whence it is poſſible, that ſome of theſe, being received into our bodies, and conveyed into the minute paſſages of the ſofteſt parts, as into neſts, may there grow, as worms do in the inteſtines, to their proper ſize. Hence by the obſtruction of the ſmalleſt veſſels, tumours ariſe; which being ſuppurated by heat, and burſting, pour forth their foul offſpring in the ſhape of worms.

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[h] Lib. de tumorib. præter nat. cap. iv.

[i] Lib. xv. cap. vii.

[k] Lib. iv. cap. xlii.

[l] De hiſt. medic. mirab. lib. i. cap. v.

[m] Oſerv. medic. lib. ii. cap. l.

[n] Decur. 2. ann. 5. append. artic. 38.

[o] Ibid. artic. 52.

[p] Ibid. artic. 109.

[q] Poterii opera cum annot. Frid. Hoffmanni edita, Francof. 1698. pag. 72.

Wherefore I cannot agree with thoſe interpreters, who imagine that Herod was conſumed by, and died of the phthiriaſis, or louzy diſeaſe. For σκωληξ is a different creature from φθεὶρ; this corrodes the ſurface of the ſkin, that the inner parts of the body. Nor can it admit of doubt, that St. Luke, who was a phyſician, well underſtood the meaning of both the words. And yet I know that the diſeaſe proceeding ὑπὸ τῶν φθειρῶν is by ſome learned men confounded with that cauſed ὑπὸ τῶν σκωλήκων; of the firſt of which Pherecides Syrius [r], and Lucius Sylla [s], are ſaid to have died. Whereupon Kuhnius ſays [t], I look upon the word σκωλεκόβρωτος in St. Luke and φθειρόβρωτος in Heſychius [u], to be ſynonimous terms: and his reaſon is, becauſe lice are worms.

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[r] Ælian. var. hiſt. lib iv. cap. xxviii.

[s] Plutarcho in ejus vita.

[t] Not. ad Ælianum.

[u] Lib. de vit. philoſ.

ORATIO

ORATIO
ANNIVERSARIA
HARVEIANA:

In THEATRO
Regii Medicorum Londinenſium Collegii
HABITA,
Ad Diem XVIII OCTOBRIS, M.DCC.XXIII.

PRÆSIDI ILLUSTRISSIMO

SOCIISQUE DOCTISSIMIS

REGII MEDICORUM LONDINENSIUM COLLEGII

DE ARTE MEDICA INDIES OPTIME MERENTIBUS

ORATIONEM HANC

IN PRÆSTANTISSIMORUM HOMINUM LAUDEM

QUI MAXIMIS SUIS BENFIICIIS

ARTEM ILLAM SUSTENTARUNT

AMPLIFICARUNT ET EXORNARUNT

HABITAM

L. M. O. D. D. D.

RICHARDUS MEAD.

ORATIO

ANNIVERSARIA

HARVEIANA.

ILLUSTRISSIME PRÆSES,
COLLEGÆ SPECTATISSIMI,
AUDITORES HUMANISSIMI.

SI, quantam vim habent ad humanas mentes amore laudis ac gloriæ incitandas magnarum virtutum exempla, tantum ego ingenii & eloquentiæ in laudandis illis heroibus, quorum hodie nobis commemoranda ſunt beneficia, afferre poſſem; haudquaquam ſane vererer, ne aut illorum meritis parum conveniens, aut veſtris auribus minus grata, quam nunc habiturus ſum, foret oratio. At vero, cum hæc res longe aliter ſe habeat, & neque natura aptus, neque uſu inſtructus ad dicendum, juſſu veſtro hoc muneris ſuſceperim; ne importuna artis affectatione vobis ſim tædio, hiſtorici potius, quam oratoris partes agens, honores medicinæ recenſebo; & per quos maxime reges aut principes, & quos apud populos, creverit ſalutaris hujus profeſſionis gloria, in brevi quaſi tabella vobis proponam. Et dum hoc faciam, partem laudis iſtius haud infimam noſtræ genti merito attribui debere manifeſte oſtendam; quo nihil aut mihi ad recitandum jucundius, aut vobis, opinor, ad audiendum acceptius, aut omnibus nobis ad prædicandum honeſtius eſſe poteſt.

Ab Ægyptiis autem, antiquiſſimis illis omnis fere ſapientiæ magiſtris, incipiam; apud quos tando fuit in honore ars noſtra, ut ne reges quidem ipſi illam facere infra dignitatem ſuam exiſtimaverint. Oſirin & Iſin in primis reginam medendi peritia excelluiſſe accepimus. Poſt horum tempora medicis ex publica pecunia dabantur præmia ; & Sacri titulum ferebat liber, in quo deſcriptæ fuerunt leges, ad quas morbis acutis laborantes curare licebat [a].

Græci uti artes omnes ſubtilius, quam Ægyptii excoluerunt ; ita præſertim medicinam, quæ ex cognitis paucarum herbarum viribus, & populari experientia conſtabat, in ſcientiam redegerunt. Fama celebres apud eos antiquitus fuerunt ſcholæ non paucæ, Rhodia cum primis, Crotonienſis Cnidia, Coa, & Smyrnæa. Crotonienſem illuſtravit Democedes, cui Darius rex Perſarum, inter captivos apud ipſum agenti, acceptum reſtitutæ ſanitatis beneficium magnis divitiis & honoribus rependit ; non ſine inſigni humanitatis, qua nihil magis medicum commendat, in Democede exemplo. Cum enim rex medicos Ægyptios, qui ſe in principio morbi imperite tractaſſent, occidi juſſerat ; ille culpæ hujus veniam impetravit, & gratiæ loco habuit conceſſam illis cum vita libertatem [b].

Cæterarum autem omnium gloriam Coœ obſcuravit ſcholæ felicitas, poſtquam ex illa prodierat, qui primus hanc diſciplinam a ſtudio ſapientiæ ſeparavit, divinus Hippocrates. Magno nomini adſurgimus omnes ! & parentem medicinæ veneramur ! qui non tantum ſapientiſſimis præceptis artem hanc formavit, ſed & ipſe vita & moribus perfectiſſimi medici exemplar expreſſit. Tanto itaque viro maximos honores delatos minime miramur, neque hos tantum a Cois ſuis, qui imagine ipſius nummos ſignarunt [c], ſed etiam ab univerſa Græcia ; quæ communi concilio, quod " venientem ab Illyriis peſtilentiam prædixerat, diſcipuloſque ad auxiliandum circa urbes dimiſerat, honores illi, quos Herculi, decrevit [d]." Civem porro adſcripſerunt Athenienſes, auro coronarunt, & victum illi & poſteris in Prytaneo dederunt [e], qui honos in Græcia maximus habebatur. Athenienſes enim, cultiſſimi ſcientiarum æſtimatores, hanc artem plurimi ſemper fecerunt ; apud quos antiqua lege cautum fuit, " Ne quis ſervus, neve qua fœmina medicinam diſceret [f]." Et tam ab iis, quam ab aliis Græciæ civitatibus, honores & immunitates eximiæ publicitus medicis concedebantur [g].

Hinc maximi omni ævo apud Græcos viri medicinam callere laudi ſibi duxerunt. Pythagoras & Democritus primi omnium de virtutibus herbarum ſcripſere [h]. Ariſtoteles, hæreditario quaſi jure ad ſe pertinere hanc artem ratus (ab Æſculapio enim genus duxit [i]) medicinam non didicit tantum, ſed & factitavit [k]; libroſque de plantis, de anatomicis, & ἰατρικῶν etiam edidit [l]. Quin & medendi peritia Magni Alexandri benevolentiam ſibi primum conciliavit; quem cum gravi morbo oppreſſum liberaſſet, hanc ab eo facultatem rex invictiſſimus doceri voluit; neque illam interdum exercere vile, aut a ſumma ſua dignitate alienum, judicavit [m]. Crevit poſtea hæc laus in familia Ariſtotelis, cujus ex filia nepos, nomine Eraſiſtratus, magna conſecutus eſt famam. Is ſectam longe celeberrimam condidit; quam in ſchola Smyrnæa, jam antea memorata, ad ſuam fere ætatem, quo tempore illi præſidebat Hiceſius, Strabo floruiſſe tradit [n]. Tam inſignis porro fuit, qui in hac urbe medicis habebatur honos, ut mihi ſane gratuler, qui, hanc occaſionem nactus, notitiam illius ex antiquitatis tenebris jam primus in lucem proferam. Honos autem, quem dico, is erat, quo communiter cum prætoribus, ſummis nimirum urbis magiſtratibus, ornabantur, ut nomen eorum nummis imprimeretur. Præterea quo magis oſtenderunt Smyrnæi, in quanto pretio eſſet apud eos ars noſtra, medicorum nomina deorum ſalutarium imaginibus in nummis adjungi volebant; quorum multi ex altera parte caput Hygiæ, ex altera vero Jovis Æſculapii effigiem cum perſpicuis medendi artis inſignibus exhibent. Neque Eraſiſtrateos ſuos tantum ita honeſtabant; ſed nonnullis etiam æmulæ Herophileorum ſcholæ, quæ iiſdem ætatibus in loco procul diſſito, “fanum Menſis Cari” appellato, inter Laodiceam ad Lycum & Carura, magna cum laude florebat [o], eundem honorem tribuebant.

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[a] Diod. Sicul. l. i. p. m. 74. [b] Herodot. lib. iii. c. 129, &c. [c] Vid. Numm. in Titul. [d] Plin. N. H. l. vii. c. 37. [e] Soran. in Vit. Hippocrat. [f] Petit. Leg. Attic. l. iii. tit. 8. [g] Lucian. Abdicat. p. m. 457. [h] Plin. l. xxv. c. 2.

A Græcis ad Romanorum tempora devenientibus minus auguſta primo intuitu, & parum læta ſeſe offert rerum noſtrarum facies. Servos fuiſſe, qui primi Romæ medicinam fecerunt, vulgo creditur; & pulſos urbe exulaſſe medicos, Catone cenſore, ſcriptis prodiderunt nonnulli. Hæc, in opprobrium artis prolata, quodnam habeant fundamentum, operæ eſt diſquirere. De ſervitute mox dicam: primum autem de exilio quæſtionem, calumniam rectius dixeram, paucis expediam. Nulla certe veterum annalium fide, nullis antiquorum monumentorum indiciis nititur hoc commentum. Primus, quod ſciam, in vulgus edidit vaniſſimus ille “De vanitate

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[i] Diog. Laert. in Vit.

[k] Ælian. Var. Hiſt. l. v. c. 9.

[l] Diog. Laert. ibid.

[m] Plutarch. in Vit. Alex.

[n] Georg. lib. xii. ſub. finem.

[o] Strabo dict. loc.

“ ſcientiarum, ſcriptor, Cornelius Agrippa [p]. Anſam vero ad hoc fingendum dedit Plinius [q], qui “ populum Romanum “ ultra ſexcenteſimum annum ſine medicis degiſſe, & expertam tandem damnaſſe medicinam,” adductis etiam Catonis ad Marcum filium adverſus hanc artem dicteriis, memoriæ mandavit. Tantum autem valuiſſe aut atrocem animum, aut auctoritatem Catonis, ut medicos urbe pelleret, nuſquam legimus. Neque damnavit omnem medicinam populus ; ſed in ea, quæ manu curat, ſecandi urendique ſævitiam (quam tamen ipſa non raro imperat miſericordia) ut novam, & aſpectu terribilem improbavit.

Sed miſſum faciamus hoc convicium, quod non ſemel antea diluerunt viri eruditi ; & qualis fuerit medicorum Romæ degentium conditio, præſertim num ſervilis, paululum diſpiciamus. Romani artes omnes a Græcis acceperunt, & ſero quidem, “ rudi ſcilicet & bellicoſa civitate non magnopere liberalibus diſciplinis vacante [s].” Nec grammaticam quidem, aut poeticam, ante annum quingenteſimum excoluerunt [t]. Primus autem, anno ſupra quingenteſimum triceſimo quinto, medicus e Peloponneſo Romam venit Archagathus ; cui is honor habitus eſt, ut “ jus Quiritium ei datum ſit & taberna in “ compito Acilio empta ob id publice [u].” Magna ſeculo ſequenti fama fuit Aſclepiadis Bithyni, tam dicendi quam medendi arte inſignis, quo ſe medico amicoque uſum fuiſſe L. Craſſus apud Ciceronem teſtatur [x] ; ex cujus etiam poſteris, ut videtur, “ Calpurnius Aſclepiades, a divo Trajano paren“ tibus, ſibi, & fratribus ſeptem civitates impetravit [y].” Neque diu poſt cum jam quotidie quæſtus cauſa ex Græcia Romam adirent medici, Julius Cæſar, in cujus manus tunc temporis ſumma rerum poteſtas devenerat, omnes hanc artem profeſſos civitate donavit [z]. “ In ſervos autem id beneficium “ fuiſſe collatum, vel ſuſpicari,” ut cum viro inter literatos principe loquar, “ nimia eſt ſtultitia [a].” Nihil igitur ſervile, aut tenue quidem, artem noſtram adhuc dedecorat. Sed ut plane, & ſine fuco, totam rem dicam ; ſimul cum ingenuis multis & doctis viris non pauci ſcientia & fortunæ bonis inferiores illis temporibus Romam veniebant ; qui, etſi non medicamentis, ſed manu curarent, medici tamen apellabantur.

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[p] De Van. Scient. cap. 83.

[q] Nat. Hiſt. l. xxix c. 1.

[s] Sueton. lib. de illuſt. grammat. in princ.

[t] Cic. in Brut. c. xviii. & Tuſcul. Quæſt. in princip. ubi vid. not. Daviſii.

[u] Plin. N. H. l. xxix. c. 1.

[x] De Orat. l. i. c. 14.

[y] Inſcript. antiq. apud. Spon. Recherch. Curieuſ. Diſſert. 27.

[z] Sueton. in Vit. c. 42.

[a] Caſaub. in dict. vit. Suet. c. 4.

Hi in divitum & magnatum clientelam ſe conferebant, & ſervi agebant, donec civitatem conſequerentur; inde liberti, nomen familiæ alicujus Romanæ ſibi adſciſcere ſolebant; neque raro, ſi ingenium ſtudio literarum excoluiſſent, morbis etiam internis medebantur, & in medicorum clinicorum cenſum veniebant. Tali conditione fuit Antonius Muſa, cui, poſtquam ejus opera ex ancipiti morbo convaluerat Octavius Auguſtus, ſtatuam, ære collato, populus Romanus poſuit [b]. Auguſtus quoque ei jus annuli aurei, & immunitatem non ipſi tantum, ſed omnibus medicinam profitentibus, in poſterum tempus conceſſit [c].

Non igitur ars erat ſervilis apud Romanos medicina; ſed liberalis, & tanto in honore, ut etiam pars ejus chirurgica, quæ a ſervis, & exili ſorte hominibus exerceri poterat, libertatem ſæpe daret, & magnas opes. Haud exigua ſane iis temporibus erant medendi facultatis præmia. Principum medicis annua ſtatuebatur merces. Iis autem, referente Plinio, "imputavit Stertinius, quod quingentis ſeſtertium millibus," pecuniæ noſtræ pluſquam ter mille & ſexcentis libris, "contentus eſſet; cum ſexcenta quæſtu urbis ſibi eſſe, numeratis domibus, oſtenderet [d]." Ipſe vero & frater ejus ſua pecunia Neapolin operibus exornarunt, & tamen "cenſus trecenties centena millia ſeſtertium hæredi reliquere [e]." Omitto plura exempla memorare, neque vobis Caſſios, Calpetanos, Arruntios, Albutios, Rubrios ſiſtam, Romana nomina, quæ profeſſione medicinæ & opibus claruerunt. Præterire autem nequeo, in nummis Rubriorum conſpici anguem, deæ Salutis ſignum, monumentum, ut videtur, familiæ ſibi medicinæ laudem vindicantis. Miror itaque in nummis iſtis explicandis neque Patinum, neque Vaillant, viros de re nummaria optime meritos, hanc, arti ſuæ adeo honorificam, inter alias ejus rei cauſas longius petitas attuliſſe [f]. In ſumma, ita non ſemper tenui fortuna homines Romæ erant medici, ut etiam imperatorum ſæpe amici eſſent & familiares [g].

Neque putet quiſquam gratia tantum ſingulari in hunc aut illum collocata fuiſſe, qualia diximus beneficia; arti habebatur honos, & univerſis eam profitentibus dabantur immunitates. Collegium enim, ſive ſcholam, ut vocabatur, medicorum in urbe fuiſſe, ex antiquis marmorum inſcriptionibus apparet [h]. Quales autem legibus dabantur illis immunitates, veterum juriſconſultorum libri nos docent. Exempla e multis pauca tantum proferam. Conſtantini Magni imperatoris extat hoc reſcriptum: " Medicos, & maxime archiatros, " grammaticos, & doctores legum, una cum uxoribus & filiis, nec non & rebus, quas in civitatibus ſuis poſſident, " ab omni functione, & ab omnibus muneribus, vel civilibus " vel publicis, immunes eſſe præcipimus; & neque in provinciis hoſpites recipere, nec ullo fungi munere, nec ad judicium deduci, vel exhiberi, vel injuriam pati; ut ſi quis " eos vexaverit, pœna arbitrio judicis plectatur [i]." Nec novo prorſus favore his omnibus beneficiis tum primum facultas hæc ſalutaris honeſtabatur. Jam ante enim " medicis & " philoſophis, ne hoſpitem reciperent, a principibus fuiſſe " immunitatem indultam," imperatores Veſpaſianus & Hadrianus reſcripſerant [k]. Item Antoninus Pius a muneribus civilibus & publicis " immunes eſſe medicos" juſſerat [l]. Deinde poſt hos omnes Julianus, qui niſi nomini maculum fixiſſet hoſtile erga Chriſtianos odium, inter ſapientiſſimos imperatores jure cenſeretur, non ſine honorifico utilitatis artis noſtræ teſtimonio, ſuperiorum principum decreta de medicis, lege lata, ſancivit, eoſque a curialibus muneribus liberos eſſe voluit [m]. Sed de rebus medicis apud populum terrarum orbis dominum ſatis, opinor, dictum fuit.

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[b] Sueton. in Vit. Aug. c, 59. [c] Dio. H. R. l. liii. ſub. fin.
[d] Lib. xxix. c. 1. [e] Ibid. [f] Vid. Patin, & Vaill. Fam. Rom.
[g] Vid. Spon. Recherch. Curieuſ. Diſſert. 27. [h] Mercur. Art. Gymn. l. i. c. 7.

Si medicinæ autem tempora, & varias quaſi ætates ſpectemus, ad Arabes jam, ſimul cum armis literarum ſtudia agitantes, nos deducit orationis filum. Iis enim ſeculis, quibus fœda barbaries cæteras fere nationes obduxerat, penes eos permanſit artis hujus ſcientia. Deficiunt quidem hac in parte annales medici, & linguæ ſuæ difficultatibus involuta in bibliothecarum forulis latent, quæ de medicorum hiſtoria gentis illius ſcriptores memoriæ mandarunt, aliquando forſan in lucem protrahenda. Speciminis autem loco ex ineditis illorum monumentis obſervare libet, imperatoris medico annuo ſtipendio fuiſſe " quindecies centena millia drachmarum [n];" quæ, ſi ad noſtram pecuniam exigantur, pluſquam tricies mille librarum ſummam conficiunt. Ingentem ſane, & forſan vix credibilem eſſe hanc principum munificentiam, quis dicet. At non tam miniſtri, quam conſiliarii, imo affines regum, apud eos habebantur medici; & terrarum reditus, & urbium præfecturæ illis ſæpe in mercedem cedebant.

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[i] Leg. 6. Cod. de profeſſ. & med. [k] Leg. ult. §. ult. ff. de mun. & hon. [l] Leg. 6. §. 2. ff. de excuſat. [m] Vid. Julian. Epiſtol. [n] Oſaibea De Vitis medicorum, mſ. Arab. Drachmæ autem hic non Atticæ, ſed Arabicæ intelligi debent; quarum hæ, ſi Golio credamus in Lex. Arab. tertia parte illis ſunt leviores. Nec longe diſcrepat Gravii ſententia, qui, ex comparatione cum granis noſtris diſcrimen petens, veterem Atticorum drachmam grana 67, Arabicam vero $47\frac{41}{50}$ exæquare ſtatuit. Vid. Greaves's Diſcourſe of the Roman Denary, p. 61, 115.

Poſtquam, renaſcentibus literis, antiqui doctrinæ fontes recludi, & in Italia primum, inde & in cæteris Europæ regionibus, fervere ſtudia ſcientiarum cœperunt, apud alios & alios populos medicina honores varios ſortita eſt; utque gloria aluntur artes, ita hæc ſemper accepta beneficia magnis in rempublicam utilitatibus rependit Longum eſſet ſcholæ Salernitanæ, Bononienſis, Patavinæ, Montis Peſſulani, Pariſienſis, & aliarum quam plurium jura & immunitates explicare; verum illud memorare juvat: ut nuſquam honoratior, quam apud nos, extitit medicina; ita nullum collegium, abſit verbis invidia, virorum ingenio & doctrina excellentium hoc noſtro fuit feracius.

Ampliſſimus hic dicendi campus ſeſe aperit; ſed monet me præſcriptum munus, ne exiguum hoc temporis ſpatium, de medicis optime meritorum memoriæ ſacrum, medicorum præconiis effluere ſinam; dicant potius exteri, quantum per Anglorum labores in medicinæ ſtudio ipſi profecerint. At quidni dicam rara felicitate id nobis contigiſſe, ut, qui hic ſalutaris ſcientiæ lumina claruerunt, iidem dignitatis noſtræ auctores & cuſtodes beneficentiſſimi celebrentur? Ecquis Linacro, qui ſub auſpiciis regis invictiſſimi, Henrici octavi, primus nos auctoritate inſtruxit, ſapientiorem, & literis cultiorem dicet quempiam? Ecquis Caio, qui inſignia poteſtatis ad decus & ornamentum addidit, arte præſtantiorem? An Harveio, qui potentiam opibus auxit, ſagaci ingenio, & naturæ ſcientia, ullum inveniemus parem? Hi nimirum veterum ſapientium more, relicta patria, terras alio ſole calentes adierunt, Italiam in primis, antiquum illud Muſarum ſacrarium; ubi parum illis fuit omne diſciplinarum genus toto pectore haurire, & domum adferre; adhuc majora animo conceperunt, formam nempe reipublicæ medicæ, qua in unum corpus, quaſi membra, coirent artis profeſſores. Amant enim ſocietatem ſcientiæ; & concordia, tanquam communi anima, vigent. Hinc alius poſt alium, veluti vicario ſtudio, legibus & ſtatutis ſodalitium hoc communiverunt; rerum geſtarum annales condiderunt; & ſolenne convivium, cum grata bene meritorum de nobis commemoratione, inſtituerunt. Vivite æternum, illuſtria nomina! Veſtræ, dum ſtabit honos medicinæ, manebunt laudes; ſtabit autem, quamdiu cura ſui tanget mortales, & morbis opportuna reddet corpora in luxum &

libidinem proclivis hominum natura. Sed & alios, quos habuimus ejuſdem laudis æmulos, ſilentio premere eſt nefas; Caldwelum, Gulſtonum, Cronium, qui ampliſſimis honorariis chirurgiæ & inciſionis ſtudium promoverunt; ut etiam munificentiſſimum Hamæum, cui viventi ædes noſtras, morienti prædiorum ſuorum hæreditatem debemus. Ut magnæ autem ſunt apud bonos virtutis illecebræ, illius præcipue, qua publicæ utilitati conſulitur; ſpectata hæc medicorum liberalitas, & in commune ſtudia ſua conferentium generoſus ardor, alios quoque viros, ſanguine pariter ac literis illuſtres, in laudis ejuſdem partem attraxit. Nec ſequior ſexus ἀσύμβολος eſſe voluit, ut, quibus ob teneram formam plus eſt in arte noſtra præſidii, aliquid etiam ad ejus decus afferre viderentur. Honoratiſſimæ igitur fœminæ, regia etiam ſtirpe illuſtres, Arabella Stuarta, & Maria comitiſſa Salopienſis, ſocia beneficentia, ad levandos ſumptus in ædibus noſtris emendis factos, pecuniam larga manu donaverunt. His adjungam nobiliſſimum virorum par, Joannem Lumleium baronem, & Henricum Durnovariæ marchionem; quorum ille cum Caldwello, quem dixi, junxit munificentiam: hic in tanto nos habuit amore, ut non modo bibliothecam dederit, optimis libris inſtructiſſimam; ſed & inter nos cenſeri, comitiis noſtris intereſſe, & rem medicam ſedulo procurare voluerit. Omine ſane felici! cum & nunc nobis gratulemur optimatem, honoris inſignibus illuſtriſſimum, & hos tamen animi magnitudine vincentem, tabulis noſtris ſuo nomine decus & ſplendorem addidiſſe.

Non ultra pergam magnorum virorum laudes, quas nec hominis diſertiſſimi vox æquare poſſet, ingenii culpa imminuere. Humanitatis profecto & ſcientiæ exempla, quæ vos, collegæ ornatiſſimi, aſſiduè oſtenditis, memoriam illorum quavis oratione longe melius conſecrabunt. Etenim dum illorum veſtigia premitis, quotidianum illis inſtauratis laudis monumentum, & prudentis conſilii, ac bene collocatæ operæ teſtimonium perhibetis perpetuum. Quis præſidem illuſtriſſimum, ſtrenue ac prudenter auctoritatem noſtram tuentem, ſuſpicit; & Linacri ſapientiam haud ſtatim ſibi repræſentat? Quis cenſoribus imperitorum artis pernicioſam audaciam coercentibus, & ne qua in pharmacis noſtris conficiendis fraus fiat providentibus, gratiam habet; vel quæſtoris in ærario adminiſtrando fidem & frugalitatem laudat; vel omnes vos denique ſine malis artibus ſaluti civium proſpicientes, & pro meritis divitiis & honoribus auctos veneratur: nec eorum, qui primi hujus diſciplinæ fundamenta poſuerunt, atque hoc domicilium ſcientiæ condiderunt, benefacta ſimul honorate prædicat, ſummiſque laudibus in cælum extollit? Macti igitur eſte ſapientia, viri clariſſimi, cœptam

tam viam pergite. Hac enim ratione laudis æque ac vitæ lampada filiis tradetis; atque hi iterum nepotibus; qui, majorum exempla ſequentes, collegii hujus jura, decus, & dignitatem, in omne ævum duratur a (ita voveo & auguror) ſuis etiam poſteris ſarta tecta conſervabunt. Dixi.

VIRO DOCTISSIMO

JOHANNI FREIND,

RICHARDUS MEAD,

S. D.

FIDEM tandem libero, amiciſſime vir, & rationem, quam in variolis curandis teneo, una cum exemplis aliquot quæ hanc illuſtrant ſimul & confirmant, quæ a me petiiſti ut chartis mandarem, ea nunc ad te mitto.

Sermo noſter erat, uti memini, de morbo, ubi ad ſummum incrementum pervenit, & quo modo eo tempore continendus ſit æger; dixi me jam ab aliquot annis uſu comperiſſe, commodiſſimum eſſe, pleriſque ſaltem in caſibus, alvum ducere; nunc, quo conſilio, & qua cum cautione id primum fecerim deſcribam breviter.

Medicos noſtros ita plerunque ſollicitos habet puſtularum conſideratio, ut ab omni fere vacuatione periculum eſſe putent, nimirum ne ab hac materiæ corruptæ concoctio turbetur, aut in partes propulſio prohibeatur.

In faciei & manuum intumeſcentia ſpem omnem ponit Sydenhamus; cum tamen mori videamus quotidie, quibus cutis etiam ad ſummum intumuit, &, ipſo fatente, plurimis in caſibus nulla arte promoveri poſſit ſalutaris ille tumor.

Mortonus, dum in committendis cum veneno morbido ſpiritibus animalibus totus eſt, ita calidiſſimis alexipharmacis, copiis, ſi Diis placet, contra deleterium hoſtem auxiliaribus, aſſidue pugnat, ut novas in ſanguine turbas cieat, & accendat quam reprimere debuit febrem; hinc illæ ipſæ quas adducit, hiſtoriæ palam faciunt, pleroſque, quorum curam habuit, ægrotos aut excalefactos interiiſſe, aut ſaltem ὡς διὰ πυρὸς evaſiſſe.

Mihi res hæc ſic ſe habere videtur; in confluentibus regularibus Sydenhamo dictis, cum jam inclinato morbo, detumuit facies, accedit, ex corrupta materia, aut in pus nondum verſa, aut ex puſtulis in ſanguinem rejecta, putrida febris, quæ calore, inquietudine, ſimilibuſque indiciis ſe prodit, &, niſi

ſuccur-

ſuccurratur, intra biduum triduumve plerumque ægrum e medio tollit, interdum vero ad plures dies protrahitur.

Utcunque vero varia jam inſtent & ſuccedant ſymptomata, illud tamen omnibus commune eſt, ut exinanitionem aliquam deſiderent. Plerumque fit, ut æger nono aut decimo, a prima puſtularum eruptione, die, cum lingua arida, pulſu arteriarum vehementiori, & ſpiritu difficiliori, incaleſcat; ubi hæc adſunt, immiſſo ſub veſperam ad ventrem ſolvendum clyſtere, poſtero die leni potione cathartica alvum duco, veſperi hauſtum narcoticum, ſi opus fuerit, ſumendum do.

In hoc morbi genere manus & pedes intumeſcunt: adeo vero non cohibet aut reprimit hunc tumorem purgatio, ut illum poſt hanc felicius procedere ſemper obſervaverim.

Evenit autem non raro, maxime in peſſimæ notæ morbo, ut cum pulſu arteriarum exiguo & languido, ſine ulla inſigni manuum intumeſcentia, febricitet ægrotus, & imminutis admodum viribus torpeat magis, quam calore uratur.

In hujuſmodi ægritudine, imponenda ſunt brachiis & cruribus emplaſtra veſicatoria; neque tamen ab omni purgatione abſtinendum eſt, ſed ea eſſe debet leniſſima & viribus ægrotantis accommodata, & per intervalla repetita; eo enim magis neceſſaria eſt, ubi non intumeſcunt partes, ventris ſolutio, quoniam in pleriſque his caſibus, etiam ipſa, quæ in puſtulis eſt, ſanies magnam partem in pus non convertitur.

Illud in univerſum hic tenendum eſt, majorem jam habendam eſſe virium ægri, quam puſtularum rationem: peracta jam eſt omnis quæ per cutem fieri poteſt morbidæ materiæ propulſio; per alias igitur vias ducendus eſt, qui periculum minatur noxius humor. Ceſſant ab officio nunc ſalivæ canales, quique a primis fere morbi diebus magna copia per hos fluxit, viſcidus jam hæret, & vix exſpuitur liquor. Urinæ excretio; ſi forte fuit per aliquot dies larga & benigna, ſæpius tamen illa hoc tempore cum difficultate & ſolito parcius redditur. Reſtant igitur expurgandæ inteſtinorum glandulæ, quæ eo ſunt corruptis humoribus e ſanguine derivandis accommodatiores, quo natura craſſiorem lentorem expellunt.

Id vero monuiſſe debueram, non hoc tantum tempore, ſed & nullo non morbi die, ægro protinus mittendum eſſe ſanguinem, ſi reſpirandi difficultas urgeat, ſi ſupervenerit phrenitis, aut alia quævis nimii fervoris febrilis ſe prodant indicia.

Ex innumeris exemplis quæ mihi quotidiana experientia ſuppeditat, pauca tantum ſeligam, ut quomodo hæc medicina ad varios & difficillimos caſus accommodetur, oſtendam.

Adoleſcenti annorum fere ſedecim, nono ægritudinis die intumuerunt admodum caput & manus acceſſit vero febris, cum magno præcordiorum æſtu, ſpiritu difficili & delirio. Miſſo quamprimum e vena brachii ad ℥xvj ſanguine, dedi pil. ruff ʒſs. & elapſis horis decem, cum nondum reſponderet alvus, elect. lenitiv. ʒvj. largiter purgatus, hauſtum ſumpſit anodynum; hinc adeo ſe remiſit febris, & levata ſunt ſymptomata, ut, præter ſpem, brevi convaluerit, licet in miſellum adeo ſævierit morbus, ut, vitiata a puſtulis in utroque oculo tunica cornea, viſu privatus vitæ dulcedinem amiſerit.

In uno atque altero adoleſcente eodem fere modo laborante feliciter expertus ſum, minime ab hac medicina abſtinendum eſſe, etiam ſi (quod non raro fit) crebra in puſtularum intervallis exanthemata erumpant, & malignitatis nomine adſtantes terreant; hæc enim non febrem ſolvunt, ſed materiæ morbidæ copiam & lentorem indicant; quo magis neceſſarium eſt, interpoſito tempore, alvum ſæpius ducere.

In puella quinque annos nata, apparebant inter puſtulas a primis decubitus diebus hic illic maculæ purpuræ & lividæ; manus vero nono die intumuerunt; die decimo, aſſumpto electuario lenitivo mota eſt alvus; poſtero die, frons, quam alba quaſi veſica obduxerat, livore decolorata eſt: hanc ſpiritu vini tepido foveri juſſi; ſingulis noctibus medicamento narcotico conciliatus eſt ſomnus; decimo quarto die, nunc primum imminuto manuum tumore, iterum purgata eſt; ut & die decimo ſexto; jamque quæ faciem exaſperaverat cruſta nigra dehiſcere cœpit, & tarde licet dirupta certam tamen ſpem ſalutis oſtendere.

Accidit interdum, ſed raro, ut ſub finem ægritudinis repullulet quaſi morbus, & ſuccedentibus ſub cruſtis, quibus obducta eſt cutis, novis puſtulis, renaſcatur; unde pro humoris abundantia etiam ultra viceſimum diem porrigitur malum; illud nuper vidi in nobili fæmina annorum quadraginta, quæ opimo corporis habitu, etiam tertium ſuccreſcentibus variolis materiam ſuffecit; facta hinc eſt per omnia membra continuata exulceratio, ad diem uſque viceſimum & octavum ſe excipientibus cruſtulis, ita ut ex longo decubitu ulcera in lumbis gangrænæ metum attulerint. Die duodecimo, leni potione purgata eſt; decimo quinto, ſubſidente qui ad hunc diem duraverat, manuum tumore, iterum alvum ſubducere neceſſe habui; &, interjectis tribus vel quatuor diebus, purgationem repetiit ad uſque morbi exitum; reſtituto tandem in integrum, poſt longam valetudinem, ulcerato corpore.

Omnem de purgatione dubitationem tollit nonnunquam in graviſſimis caſibus ipſa natura, dum in inferiora noxiam materiam depellit, continuato per plures dies alvi fluxu; hoc cum fit, ita nunc comprimi nunc ſolvi debit venter, ut ne nimiæ dejectiones vires proſternant. Incolumis hoc modo evaſit nuper admodum nobiliſſimus adoleſcens, annorum 18. Huic facies ſexto die, ſine ullo tumore, chartæ pergamenæ ſpeciem referebat; ſuppurationis ſigna nulla erant; quapropter impoſita ſunt membris emplaſtra veſicatoria, quæ ſolito plus humoris educere obſervavi. Die nono, manibus nihil prorſus intumeſcentibus, ſupervenit diarrhæa; hanc ſumptum ſæpius cum confectione fracaſtorii rhabarbarum ita compeſcuit, ut ter tamen quaterve quotidie minimum dejiceret æger; decimo quarto die, rupta in facie membrana tenui ſanie eroſa ſubtus apparebat cutis, non ante viceſimum diem decidentibus penitus ſquamulis; alvus vero, per omne id tempus, eo quo dixi modo, fluebat.

Et ſane, ut finem tandem faciam, vix quenquam graviter hoc morbo correptum ſalvum fieri vidi, niſi cui, declinante febre, aut largiter profluens urina, aut reſolutus venter, ſaluti fuit. Ut de infantibus nihil dicam, quos per totum morbum cita alvus periculo plerunque liberat.

Hæc habui, vir eruditiſſime, quæ tecum ſuper hac re communicarem; tu illis ſic utaris velim, ut dum noſtras has rationes acri tuo judicio perpendis, quantum momentum eæ habere poſſint etiam in aliis interdum febribus, quæ difficulter & tarde ſolvuntur, diſpicias. Mihi certe ita feliciter ceſſit hæc medendi via, ut humani generis intereſſe putem, ut illa publici juris fiat. Sed de hoc tu ſtatues, ut voles; ego ſatis ſuperque habeo tibi morem geſſiſſe, & quanti tua mandata faciam hoc officio comprobaſſe. Vale, & me tui amantiſſimum, quod facis, ama.

Dabam Calend. Septemb. 1716.

An ABSTRACT of part of a letter from Dr. BONOMO to Signior REDI, containing ſome OBSERVATIONS concerning the WORMS of HUMAN BODIES.

HAVING frequently obſerved that the poor women, when their children are troubled with the itch, do with the point of a pin pull out of the ſcabby ſkin, little bladders of water, and crack them like fleas upon their nails; and that the ſcabby ſlaves in the bagnio at Leghorn, do often practiſe this mutual kindneſs upon one another; it came into my mind to examine what theſe bladders might really be.

I quickly found an itchy perſon, and aſking him where he felt the greateſt and moſt acute itching, he pointed to a great many little puſtules not yet ſcabbed over, of which picking out one with a very fine needle, and ſqueezing from it a thin water, I took out a very ſmall white globule ſcarcely diſcernible: obſerving this with a microſcope, I found it to be a very minute living creature, in ſhape reſembling a tortoiſe, of whitiſh colour, a little dark upon the back, with ſome thin and long hairs, of nimble motion, with ſix feet, a ſharp head, with two little horns at the end of the ſnout.

Not ſatisfied with the firſt diſcovery, I repeated the ſearch in ſeveral itchy perſons, of different age, complexion and ſex, and at differing ſeaſons of the year, and in all found the ſame animals; and that in moſt of the watery puſtules, for now and then in ſome few, I could not ſee any.

And though by reaſon of their minuteneſs, and colour the ſame with the ſkin, 'tis hard to diſcern theſe creatures upon the ſurface of the body, nevertheleſs I have ſometimes ſeen them upon the joints of the fingers in the little furrows of the cuticula, where with their ſharp head they firſt begin to enter, and by this gnawing and working in with their body, they cauſe a moſt troubleſome itching, till they are got quite under the cuticula; and then 'tis eaſy to ſee how they make ways from place to place by their biting and eating, one ſingle one happening ſometimes to make ſeveral puſtules, of which I have often found two or three together, and for the moſt part very near to one another.

With great earneſtneſs I examined whether or no theſe animalcules laid eggs, and after many enquiries, at laſt by good fortune while I was drawing the figure of one of them by a microſcope, from the hinder part I ſaw drop a very ſmall and ſcarcely viſible white egg, almoſt tranſparent, and oblong, like to the ſeed of a pine-apple.

I oftentimes found theſe eggs afterwards, from which no doubt theſe creatures are generated, as all others are, that is, from a male and female, though I have not yet been able by any difference of figure, to diſtinguiſh the ſex of theſe animals.

From this diſcovery it may be no difficult matter to give a more rational account of the itch, than authors have hitherto delivered us. It being very probable that this contagious diſeaſe owes its origin neither to the melancholy humour of Galen, nor the corroſive acid of Sylvius, nor the particular ferment of Van Helmont, nor the irritating ſalts in the ſerum of lympha of the moderns, but is no other than the continual biting of theſe animalcules in the ſkin, by means of which ſome portion of the ſerum ouzing out through the ſmall apertures of the cutis, little watery bladders are made, within which the inſects continuing to gnaw, the infected are forced to ſcratch, and by ſcratching increaſe the miſchief, and thus renew the troubleſome work, breaking not only the little puſtules, but the ſkin too, and ſome little blood-veſſels, and ſo making ſcabs, cruſty ſores, and ſuch like filthy ſymptoms.

From hence we come to underſtand how the itch proves to be a diſtemper ſo very catching; ſince theſe creatures by ſimple contact, can eaſily paſs from one body to another, their motion being wonderfully ſwift, and they as well crawling upon the ſurface of the body, as under the cuticula, being very apt to ſtick to every thing that touches them, and a very few of them being once lodged, they multiply apace by the eggs which they lay.

Neither is it any wonder if this infection be propagated by the means of ſheets, towels, handkerchiefs, gloves, &c. uſed by itchy perſons; it being eaſy enough for ſome of theſe creepers to be lodged in ſuch things as thoſe; and indeed I have obſerved that they will live out of the body two or three days.

Nor in the laſt place, ſhall we be at a loſs to know the reaſon of the cure of this malady by lixivial waſhes, bathes, and ointments made up with ſalts, ſulphurs, vitriols, mercury's ſimple, precipitate or ſublimate, and ſuch ſort of corroſive and penetrating medicines. Theſe being infallibly powerful to kill the vermin lodged in the cavities of ſkin; which ſcratching will never do, partly by reaſon of their hardneſs, and partly becauſe they are ſo minute as ſcarcely to be found by the nails.

Neither do inward medicines perform any real ſervice in this caſe, it being always neceſſary after a tedious uſe of theſe to have recourſe to thoſe external ones already mentioned. And if in practice we oftentimes experience, that this diſeaſe, when we think it is quite cured by unction, does nevertheleſs in a ſhort time return again, this is not ſtrange, ſince though the ointment may have killed all the living creatures, yet it may not probably have deſtroyed all their eggs, laid as it were in the neſts of the ſkin, from which they may afterwards breed again and renew the diſtemper. And upon this account, 'tis very adviſable, after the cure is once performed, ſtill to continue the anointing for a day or two more; which it is the eaſier to do, becauſe theſe liniments may be made agreeable enough, and of a good ſmell, as particularly is that compounded of the ointment of orange flowers or roſes, and a ſmall quantity of red precipitate.

An Account of the Three Caſes of the Hydrophobia.

THE ſymptoms from the bite of a mad dog are ſo ſurpriſing and terrible, that it is hardly poſſible to deſcribe the agony of a patient in this unhappy condition. I have lately had the opportunity to ſee two inſtances of this caſe.

The firſt was of a lad of about the age of nine years, a ſturdy and bold boy. A mad bitch of the mungrel kind was hunted in the ſtreet, he ſtruck at her with a ſtick, and ſhe flying in his face, bit him in the right cheek, which was torn with a large wound to the middle of the noſe. This was on the 20th of April laſt, 1709. A ſurgeon cured the wound in about 14 days time, by applying for the firſt three days, theriac. andromach. in ſp. vin. and afterwards dreſſing it with liniment. arcæi and balſam. terebinthin. No other care was taken, only a bolus of theriac. andromach. was given him every night while under cure, and quickly after he was bit, he was perſuaded to eat the whole liver of the bitch fried.

He continued very briſk and well to the 22d of May; upon that day he ſeemed dull and ſick, would eat no dinner, except a little boiled ſpinnage, walked out in the afternoon, and in the evening complained of his ſtomach and head; his mother gave him a ſmall glaſs of brandy, for he would drink nothing elſe. In the night he was very bad, ſtartled often, and ſcreamed out as in an agony, eſpecially when deſired to drink, and complained miſerably whenever he made urine, ſaying it hurt him. The next morning he vomited up the herbs he had eat the day before, unaltered. I was ſent for that day in the afternoon, and found him in a perfect agony, all in a ſweat, trembling, toſſing himſelf up and down, talking continually, looking very wild; his pulſe low, and ſometimes quicker, then ſlower: his urine made the night before as well coloured as ordinary. I deſired him to drink; he took a little in his mouth, but as it was going down, he threw it out with violence, ſaying it hurt him; and praying that he might take no more. We over perſuaded him to hold a little in his mouth and ſwallow it by degrees and gently; he did ſo with a little more eaſe, but was glad when it was over. We bid him ſuck the drink through a quill; he tried, but could not get it down by continual gulps, but ſtopped as ſoon as a very little was paſſed, ſtill crying out that it hurted him to ſwallow it.

I preſently declared the caſe to be deſperate. However for the ſatisfaction of the relations, bliſtering plaiſters were applied to the back and on each ſide of the neck; and a diuretic bolus of ſal. ſuccin. camphor. and conſerv. lujul. was given every ſix hours; for he ſeemed from the firſt of his complaint to have a difficulty of urine.

The next day, the 24th at noon, I found him much worſe, he had raved all night; could not bear the ſight of any thing white, and ſaid, that if all the women in the room who had white aprons would go out, he ſhould be well preſently. He ſaid he would drink, if we would give him it in a black cup; but when brought, made many excuſes and could not, though at the ſame time complained he was dry, and pleaſed himſelf with talking of full pots. He eat ſome bread and butter heartily, but vomited it up quickly together with a frothy ſlime. We dipped him in a tub of warm water; he ſaid he was not afraid of water, and was quiet in it for a little while, but ſoon fell into a convulſion fit, which obliged us to take him out. I obſerved his eyes to grow more ſtaring, and the pupil to be prodigiouſly inlarged. He was was thrown continually with ſuch violence from place to place, that it was very hard to keep him in bed; and quite tired and ſpent, fell into cold ſweats, and died this day at four in the afternoon.

The next day I obtained leave to open the body. We examined the brain, throat, breaſt and ſtomach, but met with no extraordinary appearance any where, excepting that there was a great quantity of greeniſh viſcid bile in the ſtomach.

The other patient was a very luſty vigorous man of 45 years. He had ten weeks before been bit in one of the forefingers near the nail, by a little naked dog of the Guinea breed. On the 8th of November in the morning, he complained of a great ſickneſs at ſtomach, and vomited green and yellow choler. The next morning he took a doſe of rad. ipecacuanh. Whilſt he was vomiting, he complained of a difficulty of ſwallowing; and when preſſed to drink to work off the medicine, contrived himſelf a way of ſucking the gruel given him, through a piece of a tobacco pipe, but could not get down above one pint; and though he afterwards often tried this trick, yet it did not ſucceed.

On the 10th he had eight ounces of blood taken away at the arm, and took a bolus of theriac. andromach. with lap. contrayerv.

I came to him on the 11th; found him tied in his bed, raving mad, biting and ſpitting at the by-ſtanders, crying out murder, making an odd noiſe, as if he coughed up ſomething from the throat; this motion I had alſo took notice of in the boy, and I ſupppoſe this is what ſome authors have called barking.

He ſaid he would drink if we would unbind him, and give him water; but as ſoon as it came to his mouth, he threw away the cup with the greateſt fury imaginable, and grew ſo unruly, that he was with much ado tied down again.

I obſerved that he had a palſy of his right arm, for he moved this only by the help of the other; and thoſe who attended him, had taken notice that this ſymptom began the day before, and that at the ſame time he had endeavoured to read, but could not, complaining of a miſt before his eyes.

As he ſeemed afraid of every body, ſo he ſhewed the greateſt enmity to thoſe, for whom at other times he uſed to have the moſt love and reſpect.

I ordered a ſurgeon to take away 20 ounces of blood at his arm: and obſerved it to be very thick and black. He was very tame after this for a few minutes, but fell again into his outrageous fit, in which he ſoon laid himſelf down quite ſpent, and died.

I could not by all poſſible means get leave to open the body.

Since theſe accidents I have had an account ſent me by a ſurgeon from Stamford in Lincolnſhire, of a young man of about 18 years, who died hydrophobus by the bite of a mad fox, that had been bit by a mad dog The ſymptoms diſcovered themſelves three months after the wound, which was upon the back of the hand, and being healed by the application of theriaca andromach. had left a ſmall ſcab behind.

Three days before his death he was ſeized with a fever, for which he was blooded, vomited and bliſtered; he bit to pieces the glaſs in which drink was given him. When diſſected, the fauces were found very much inflamed; the left lobe of the lungs black, with the veſicles full of black blood; the ſurface in ſome places, which the blackneſs had not covered, appearing bliſtered, as if raiſed by cantharides. The liver was hard and of a yellow bilious colour.

During the whole violence of the diſtemper, the penis was obſerved to be continually erected, and as hard as a bone. This ſymptom is particularly taken notice of by Cælius Aurelianus.

The ſurgeon who opened the body, with his knife ſlightly wounded his fore-finger, and was ſurprized to find that it feſtered, and gave him much more pain than a greater cut had at other times done. This I the rather take notice of, becauſe ſomething of the ſame nature happened to the ſurgeon who diſſected my patient. His hand, the following night, was taken with an eryſipelas, attended with great tenſion and pain: this was owing to a little wound made in one of his fingers a day or two before, from which, in turning over the parts he had rubbed off the plaiſter; and it went not off without the continued application of cooling and diſcutient medicines.

From all theſe hiſtories, it may not perhaps be wrong to conclude, that the [a] Hydrophobia, (a name not very proper for the diſtemper) is the effect of a particular kind of an inflammation in the blood, accompanied with ſo great a tenſion and dryneſs of the nervous membranes, and ſuch an elaſticity and force of the fluid with which they are filled, that the moſt common repreſentations are made to the mind with too great effect, and the uſual impreſſions of objects upon the organs cannot be ſuffered: hence proceed the timorouſneſs, unaccoutable anxiety and inquietude, which are always the forerunners of the dread of liquids; as alſo did the pain in making water, and the ſtrange averſion obſerved in the boy at the ſight of any thing white; the retina being really hurt and grieved by the ſtriking of the rays of light upon it. Nor is it hard to conceive, that when the ſalival liquor is hot, and the throat inflamed and dry, the ſwallowing of drink ſhould cauſe ſuch an intolerable agony; no more than it is that, when things are wrought up to this wretched condition, the diſmal tragedy ſhould not laſt above three or four days at moſt, in which the patient is perfectly fatigued and torn to death by the violence of his actions and efforts.

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[a] Vid. Eſſays on Poiſons.

INDEX.

I N D E X.

A.

AARON, a native of Alexandria, who practiſed as a phyſician about the year 622. was probably the firſt writer that noticed the ſmall-pox and meaſles, p. 230. and from him Rhazes ſeems to have derived his knowledge of thoſe diſtempers, *ibid.*

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